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The Terrestrial Isopods (Oniscidea) of Greece. 20th Contribution: Genus *Leptotrichus* (Porcellionidae)*)

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With 103 figures

Summary

The terrestrial isopod genus *Leptotrichus* Budde-Lund, 1885 is redefined. An annotated list of all nominal species with complete bibliographies is presented, nine species are considered as valid. For the Greek species *Leptotrichus kosswigi, L. naupliensis, L. panzerii, L. pilosus medius, L. spinosus* **n.sp.** and *L. syrensis* the diagnostic characters are described and figured in drawings or scanning electronic microscope photographs. Numerous new records for these species are reported and their known distribution is mapped.

Zusammenfassung

Die Landisopoden-Gattung *Leptotrichus* Budde-Lund, 1885 wird neu definiert. Eine kommentierte Liste aller nominellen Arten mit vollständigen Bibliografien wird präsentiert. Neun Arten werden als gültig erachtet. Für die griechischen Arten *Leptotrichus kosswigi, L. naupliensis, L. panzerii, L. pilosus medius, L. spinosus* **n.sp.** und *L. syrensis* werden die diagnostischen Merkmale beschrieben und in Zeichnungen oder rasterelektronenmikroskopischen Aufnahmen dokumentiert. Zahlreiche neue Nachweise dieser Arten werden angeführt und ihre Verbreitung wird auf Karten dargestellt.

Contents

1. The genus *Leptotrichus* Budde-Lund, 1885 2
2. Annotated list of the nominal species of *Leptotrichus* 3
3. The Greek species of *Leptotrichus* 11
   3.1. *Leptotrichus kosswigi* Strouhal, 1960 11
   3.2. *Leptotrichus naupliensis* (Verhoeff, 1901) 17
   3.3. *Leptotrichus panzerii* (Audouin, 1826) 35
   3.4. *Leptotrichus pilosus medius* Verhoeff, 1941 42
   3.5. *Leptotrichus spinosus* **n.sp.** 48
   3.6. *Leptotrichus syrensis* (Verhoeff, 1902) 53
4. Acknowledgments and abbreviations 56
5. Literature 58

*) 19th contribution: Stuttgarter Beitr. Naturk. (Serie A) 582: 20 pp. (1998).

1. The genus *Leptotrichus* Budde-Lund, 1885

Type species: *Porcellio Panzerii* Audouin, 1826, designated by BUDDE-LUND (1908: 281).

BUDDE-LUND (1885: 192) erected and diagnosed *Leptotrichus* as a subgenus of *Porcellio,* including the species *Porcellio panzerii* Audouin, 1826 = *Porcellio ciliatus* Brandt, 1833, *Porcellio truncatus* Brandt, 1833, *Porcellio fuscovariegatus* Lucas, 1849, *Leptotrichus tauricus* Budde-Lund, 1885 and *Leptotrichus squamatus* Budde-Lund 1885. Today only *panzerii* and *tauricus* are considered as members of the genus *Leptotrichus,* while *fuscovariegatus* is ascribed to *Soteriscus,* and *truncatus* and *squamatus* (both without real pleopodal lungs) belong to *Niambia.*

For former definitions and references to the history of the genus see STROUHAL (1960: 90) and VANDEL (1962 b: 644).

Officially the isopod genus *Leptotrichus* Budde-Lund, 1885 is a junior synonym of *Leptotrichus* Clark, 1860, a monotypic South American genus of chrysomelid Coleoptera. I was unable to trace the history of the latter name and could not find out whether it is still considered a valid taxon. The isopod name *Leptotrichus* Budde-Lund, 1885 has been constantly in use now for more than 100 years, so I prefer, not to substitute it before the taxonomic situation is clarified and the possibility can be excluded that the name can be preserved for the isopod genus.

Diagnostic characters of *Leptotrichus:*

1. Pereion-epimera very steep, in cross-section nearly a semicircle (adaptation to digging behavior).
2. Tergal parts smooth, without traces of tuberculation.
3. Head with a very prominent pointed median process surpassing the small lateral lobes (wedge-function in digging).
4. Pleon with well-developed epimera forming a closed outline.
5. Telson triangular, with concave sides and rounded or pointed apex.
6. Antennae II very short, not surpassing pereion-tergite I (again an adaptation to digging).
7. Pereiopods, especially V to VII, with rings of strong spines around distal ends of merus and carpus (to increase driving force of these legs in digging: ski pole principle).
8. Basipodites of all legs in both sexes with conspicuous distal spine reaching a length of half the diameter of the basipodite.
9. Male pereiopods I–IV on merus and carpus with spiny brushes as in many species of the super-family Oniscoidea with rather smooth tergites (prevents sliding during copulation).
10. Pleopod-exopodites I and II with invaginated lungs, slotlike entrance ventrally in a respiratory field separated by a ledge from the remaining surface of the exopodite; this lung construction is similar in all genera of the family Porcellionidae.
11. Uropod-exopodites not longer than telson.

None of these diagnostic characters are unique in *Leptotrichus,* but the specific combination, together with the zoogeographical situation, plead for a monophyly of the genus in the present scope. As already recognized by VERHOEFF (1908 a: 181) the most probable sister-group of *Leptotrichus* is the genus *Agabiformius* which differs from *Leptotrichus* by the characters:

1. Epimera flatter, no semi-circle in cross-section;
2. tergal parts at least with traces of tuberculation;
3. head with median lobe rounded, not wedge-shaped;
4. basipodites of pereiopods I–IV with distal spine not elongated, reaching less than one third of diameter of basipodite.

The species of *Leptotrichus* are extremely well adapted to digging in loose sandy substrate. The fact that all species living around the Mediterranean Sea seem to be restricted to litoral biotopes may have to do with this dependence on sandy substrate, as it becomes evident from the occurrence in desert biotopes far away from the seacoast (see distribution maps figs. 55, 68, 93).

Inside the genus the 3 species *L. panzerii, L. syrensis* and *L. leptotrichoides* seem to form a monophylum characterized by a synapomorphic row of long straight setae all along the epimeral margins and standing at a right angle with these margins (function unknown). The phyletic relations among the other species have yet to be worked out.

2. Annotated list of the nominal species and subspecies of *Leptotrichus*
(valid species *numbered* and in **bold type**)

Leptotrichus atracheatus Schmalfuss & Ferrara, 1978 = ***Niambia atracheata***

Leptotrichus atracheatus: Schmalfuss & Ferrara 1978: 85, figs. 169–170 (ascription to *Niambia* in Schmalfuss 1982: 132).

Remarks: The species was erroneously ascribed to *Leptotrichus* because of its very *Leptotrichus*-like outside morphology which has probably to do with the lifestyle as sand-diggers. *Leptotrichus* is a Mediterranean genus with invaginated lungs in the first two pleopod-exopodites, while *Niambia* is of South African origin and has no real lung structures in the pleopod-exopodites. *Niambia atracheata* is known for sure only from the Cape Verde Islands.

Leptotrichus bilselii Verhoeff, 1941 = nomen dubium

Leptotrichus nauphiensis [sic] *bilselii:* Verhoeff 1941: 246, 247, figs. 36–37 (southern Turkey: Pozanti 60 km NW Adana).
Leptotrichus naupliensis bilselii: Verhoeff 1943: 25.
Leptotrichus (leptotrichus) bilselii: Strouhal 1960: 93.
Leptotrichus bilselii: Verhoeff & Strouhal 1967: 483, 484.

Remarks: This "subspecies" has been collected at Pozanti NW Adana (southern Turkey) together with *L. naupliensis "thermiensis"* (which is the "true" *naupliensis*); fig. 36 of Verhoeff's description shows a pleopod-exopodite I not different from *naupliensis,* in an available slide preparation of pereiopod VII (ZSM) no ridge is recognizable in carpus VII; this could however be due to an immature status of the specimen or to a regenerated leg. So the taxonomic situation of this form can only be clarified when further material from the locality concerned is available.

Leptotrichus byrensis is a printing mistake for ***L. syrensis***

Leptotrichus byrensis: VERHOEFF 1941: 245 (Turkey, "Burdursee", female).

Leptotrichus cecconii Dollfus, 1905 = ***L. naupliensis***

Leptotrichus cecconii naupliensis (Verhoeff, 1901) = identification doubtful

Leptotrichus Cecconii naupliensis: ARCANGELI 1938: 37 (western Turkey: Izmir).

Remarks: The diagnostic characters of *L. naupliensis* were not recognized until STROUHAL (1960), thus it is not clear to which species this male specimen from Izmir should be ascribed.

Leptotrichus chobihige Nunomura, 1992 = ***Agabiformius lentus***

Leptotrichus chobihige NUNOMURA 1992: 17, figs. 186 A–L (Japan).

Remarks: According to the drawings of the specimens from Japan described as *Leptotrichus chobihige* they certainly belong to *Agabiformius lentus.* This originally Mediterranean species has been introduced by anthropogenous transportation to many parts of the world.

Leptotrichus corninger Verhoeff, 1949 = ***L. mersinensis corniger***

Leptotrichus dohrnii Verhoeff, 1952 = nomen dubium

Leptotrichus dohrnii: VERHOEFF 1952: 138 (without figures).

Remarks: The species has been shortly and vaguely described after juveniles of maximum 4 mm length, figures are lacking. VERHOEFF pointed out that the specimens differ from *L. panzerii* of the same size by the lack of long setae on the epimeral margins. The author mentioned differences towards *L. naupliensis* which do not seem to justify a specific separation. So for the moment, until adult specimens are appropriately described from the type locality (which is a garden in the town of Napoli in Italy) I consider *L. dohrnii* a nomen dubium.

Leptotrichus emarginatus Pearse, 1917 = ***Nagurus cristatus***

Leptotrichus emarginatus: PEARSE 1917: 5, fig. 3; VAN NAME 1925: 466.

Remarks: According to ARCANGELI (1930 b: 11) *Leptotrichus emarginatus,* described from northern South America, is a synonym of *Nagurus cristatus.*

Leptotrichus fuscatus (Iwamoto, 1943) = ***Agabiformius lentus***

Porcellio fuscatus: IWAMOTO 1943: 969, figs. 17–18 (Japan).
Leptotrichus fuscatus: NUNOMURA 1987: 63, figs. 129 A–F (Japan).

Remarks: According to the exact figures given by IWAMOTO (1943) this species is *Agabiformius lentus.*

Leptotrichus fuscovariegatus (Lucas, 1849) = ***Soteriscus fuscovariegatus***

Leptotrichus fuscovariegatus: Budde-Lund 1885: 194 (Algeria).

Leptotrichus granulatus Richardson, 1902 = ***Agabiformius lentus***

Leptotrichus granulatus: RICHARDSON 1902: 303, plate XL, fig. 58 (Bermudas); – RICHARDSON 1905: 624, fig. 672; – PEARSE 1916: 543 (Santa Marta in Colombia); – BOONE 1918: 603; – VAN NAME 1936: 253, fig. 144.

Remarks: SCHULTZ (1972 a: 89) has examined "cotypes" of this species and considers it a synonym of *L. panzerii.* RICHARDSON's description, however, fits exactly with *Agabiformius lentus;* especially the described coloration, with four rows of brown patches, is that of *A. lentus* and never occurs in any species of *Leptotrichus.* Also the figure shows *A. lentus* and not *L. panzerii,* and RICHARDSON herself remarks that the new species "seems more closely related to the last named [*lentus*] than to any of the former [*panzerii* etc.]".

Leptotrichus inquilinus Koelbel, 1894 = ?***Tura inquilina***

Leptotrichus inquilinus: KOELBEL (in WASMANN) 1894: 202, 221 ("Somaliküste"); – BUDDE-LUND 1898: 8; – FERRATA & TAITI 1998: 287.

Remarks: BUDDE-LUND (1913 b: 380) places this species with a question mark in the genus *Tura.*

Leptotrichus ischianus Verhoeff, 1942 = ***L. naupliensis***

Remarks: VANDEL (1965: 825) synonymizes *L. ischianus* with *L. naupliensis* after having examined specimens from Ischia.

Leptotrichus isthmicus Van Name, 1926 = ***Trichorhina isthmica***

Leptotrichus isthmicus: VAN NAME 1926: 3, figs. 1–3.

Remarks: VAN NAME (1936: 203) realized the affiliation of the species to the genus *Trichorhina.*

1. *Leptotrichus kosswigi* Strouhal, 1960 (chapter **3.1.**)

Leptotrichus naupliensis non Verhoeff, 1901: STROUHAL 1929 a: 82, figs. 19–23 (Greece: island Mikonos); – VERHOEFF 1949: 47 (S-Turkey, "Elma Dağı (Hatay)", see chapter 3.1., material examined).

Leptotrichus kosswigi: STROUHAL 1960: 93, 97, figs. 1–9 (southern Turkey: region of Iskenderun, and southwestern Turkey: near Fethiye); – VERHOEFF & STROUHAL 1967: 483, figs. 13–14; – SCHMALFUSS & SCHAWALLER 1984: 9, 10, 11 (Greece: island Santoríni); –

SFENTHOURAKIS 1994: 98, figs. 52–53 (not figs. 50–51 as indicated in the figure captions – printing error!) and map p. 169 (Greece: central Aegean islands); – SFENTHOURAKIS 1996 b: 697; – SCHMALFUSS 1999: 5, 6 (Greece, partly: islands Kárpathos, Saría and Kastellórizo; the specimens from Lésvos belong to *L. pilosus medius*).

Recorded distribution (see chapter 3.1. and map fig. 1): Coasts of the northeastern Mediterranean.

Leptotrichus kudakaesensis Nunomura, 1987 = ***?Agabiformius lentus***

Leptotrichus kudakaensis: NUNOMURA 1987: 64, figs. 130 A–L.

Remarks: According to the figures of NUNOMURA (1987) does certainly not belong to *Leptotrichus* and could be *Agabiformius lentus.*

Leptotrichus lentus (Budde-Lund, 1885) = ***Agabiformius lentus***

Leptotrichus lentus: DOLLFUS 1896: 542, fig. 5.

2. *Leptotrichus leptotrichoides* (Arcangeli, 1942)

Porcellio (Lucasius) leptotrichoides: ARCANGELI 1942: 223, plate I, figs. 1–5 (Salvage Islands).
Mica leptotrichoides: VANDEL 1954 b: 3 (island Gomera); – ARCANGELI 1958: 98.
Leptotrichus (Atlantotrichus) leptotrichoides: VANDEL 1957: 418, figs. A–C (Salvage Islands); – DALENS 1977: 293, figs. 1–5 (Salvage Islands).
Leptotrichus leptotrichoides: HOESE 1984: 30.
Atlantotrichus leptotrichoides: SCHMÖLZER 1965: 249.

Recorded distribution: Canary Islands (Gomera) and Salvage Islands (Grande Salvage).

Leptotrichus medius Verhoeff, 1941 = ***L. pilosus medius***

3a. *Leptotrichus mersinensis mersinensis* Verhoeff, 1941

Leptotrichus nauphiensis [sic] *mersinensis:* VERHOEFF 1941: 246, 247, figs. 34–35 (southern Turkey: near Mersin).
Leptotrichus naupliensis mersinensis: VERHOEFF 1943: 25.
Leptotrichus mersinensis: STROUHAL 1960: 93; – VERHOEFF & STROUHAL 1967: 483.
Leptotrichus mersinensis mersinensis: VERHOEFF & STROUHAL 1967: 483, 484.

Recorded distribution: Southern Turkey near Mersin.

3b. *Leptotrichus mersinensis corniger* Verhoeff, 1949

Leptotrichus corniger: VERHOEFF 1949: 30, figs. 13–15 (southern Turkey: Vilayet Antakya); – STROUHAL 1960: 93.
Leptotrichus mersinensis corniger: VERHOEFF & STROUHAL 1967: 482, 484.

Recorded distribution: Southern Turkey, Vilayet Antakya, "Elma Daği".

Leptotrichus mesopotamicus Frankenberger, 1939 = ***L. pilosus mesopotamicus***

Leptotrichus nauphiensis [sic] (Verhoeff, 1901) = ***L. naupliensis*** (printing mistake)

Leptotrichus nauphiensis [sic] *bilselii* Verhoeff, 1941 = ***L. naupliensis bilselii***

Leptotrichus nauphiensis [sic] *mersinensis* Verhoeff, 1941 = ***L. mersinensis mersinensis***

4. *Leptotrichus naupliensis* (Verhoeff, 1901) (chapter **3.2.**)

Porcellio naupliensis: VERHOEFF 1901: 403 (Greece, Peloponnese, Navplio (= Nauplia) (females from Kifissiá and Pátras doubtful); – VERHOEFF 1902: 255.

Leptotrichus Cecconii: DOLLFUS 1905: 175, fig. 6 (Cyprus); – ARCANGELI 1936 a: 11 (Cyprus).

Leptotrichus naupliensis: VERHOEFF 1908 a: 182 (identification not safe); – VERHOEFF 1923: 223, fig. 11 (localities in today's Israel); – non STROUHAL 1928: 796, and 1929 a: 82, figs. 19–23 (= *L. kosswigi*); – STROUHAL 1929 b: 53 (Greece, identification not safe); – VERHOEFF 1933 b: 3, 25, 29 (Sicily); – STROUHAL 1936 b: 198 (Greece, identification not safe); – STROUHAL 1937 a: 64, 1937 b: 128, 1937 c: 196, 223, 259 and 1938: 32, 54 (Greece, identification not safe); – STROUHAL 1937 d: 181; non VERHOEFF 1941: 246 [*L. "nauphiensis* (genuinus)"]; – non VERHOEFF 1949: 47 (Turkey: Hatay, = *L. kosswigi,* see chapter 3.1, material examined); – VERHOEFF 1952: 138; – STROUHAL 1960: 94, 96 (Greece: Yíthio, islands Dhílos and Kíthnos; Egypt: Cairo; ?Turkey, only females); – VANDEL 1965: 825 (Cyprus; Italy: Island of Ischia); – VERHOEFF & STROUHAL 1967: 482, 484; – CARUSO 1968: 359 (Eolian Islands); – VANDEL 1969: 25 (Sicily); – SHEREEF 1970: 369 (Egypt, identified by A. VANDEL); – EL-KIFL et alii 1971: 285 ff. (Egypt, identified by A. VANDEL); – CARUSO 1973 b: 2; – SCHMALFUSS 1975: 40 (Greece, partly mixed up with *L. kosswigi*); – SCHMALFUSS 1979: 19 (Greece, partly mixed up with *L. kosswigi*); – ?SCHMALFUSS 1981: 17 (Greece, female); – CARUSO & LOMBARDO 1982: 24 (Malta); – SCHMALFUSS & SCHAWALLER 1984: 10, 11 (Greece: island Santoríni); – KHEIRALLAH & OMRAN 1986: 319 (Egypt, identification needs confirmation); – CARUSO et alii 1987: 37, 154 (records from Sicily, Malta and Eolian Islands); – SFENTHOURAKIS 1993: 618 (Greece: islands Crete, Kíthira and Antikíthira); – SFENTHOURAKIS 1996: 697 (Greece: 22 central Aegaean islands); – HORNUNG & WARBURG 1996: 181 (Israel, ecology); – SCHMALFUSS 1999: 5, 6 (Grece: Kárpathos archipelago and islands Tílos and Kastellórizo); – WARBURG & HORNUNG 1999: 1474 (Israel, ecology).

Leptotrichus politus: OMER-COOPER 1923: 104, plate VI, figs. 1–13 (Iraq: Amara); – STROUHAL 1960: 92, 93, 100, 101; – AHMED 1974: 25, figs. 3 A–G (Iraq: Basrah).

Leptotrichus cecconii: RICHARDSON 1926: 207, figs. 2–3 (Syria: 30 km NW Damascus).

Leptotrichus naupliensis thermiensis: STROUHAL 1936 b: 198 (Greece: island Kíthnos); – STROUHAL 1937 c: 196, 224, 259, figs. 18–19 (Greece: island Kithnos); – STROUHAL 1938: 32, 33; – VERHOEFF 1941: 246, 247 (Turkey: Antalya and Pozanti 60 km NW Adana); – VERHOEFF 1943: 25; – VANDEL 1955: 499 (Lebanon); – VANDEL 1957: 419.

?*Leptotrichus Cecconi naupliensis:* ARCANGELI 1938: 37 (western Turkey: Izmir, identification doubtful).

Leptotrichus ischianus: VERHOEFF 1942: 445, fig. 13; – STROUHAL 1960: 93.

Leptotrichus (Leptotrichus) naupliensis: STROUHAL 1960: 93, 94 (Turkey); – STROUHAL 1968: 331, figs. 33–34 (Cyprus); – PRETZMANN 1974: 447 (Israel); – STROUHAL & PRETZMANN 1975: 636, figs. 14–26 (Israel).

Recorded distribution (see chapter 3.2. and maps figs. 26, 27): Sicily, Calabria and island Ischia (west coast of Italy), Peloponnese, southern Aegean islands, south

coast of Turkey, Cyprus, Lebanon, southwestern Syria, Israel, northern Egypt (Cairo and Suez Canal), Iraq. Conspicuously missing in the northern Aegean as *L. kosswigi* (climatic factors and/or competition by congeneric species?).

Leptotrichus naupliensis bilselii Verhoeff, 1941 = ***L. bilselii***

Leptotrichus naupliensis mersinensis Verhoeff, 1941 = ***L. mersinensis mersinensis***

Leptotrichus naupliensis thermiensis Strouhal, 1937 = ***L. naupliensis*** (see STROUHAL 1960: 96).

5. *Leptotrichus panzerii* (Audouin, 1826) (chapter **3.3.**)

Porcellio Panzerii: AUDOUIN 1826: 98, plate 13, fig. 7 ("Egypt").
Porcellio ciliatus: BRANDT 1833: 481 ("Aegyptus vel Syria").
Trichoniscus flavescens: LUCAS 1849: 71, plate 7, fig. 3 a–c (Algeria).
Porcellio (Leptotrichus) Panzeri: ARCANGELI 1926 a: 33 (Croatia); – ?ARCANGELI 1926 b: 267 (Sicily); – ?ARCANGELI 1929 a: 266 (Ródhos, identification doubtful); – ARCANGELI 1929 b: 67 (Italy); – ARCANGELI 1930 a: 84 (Canary Islands).
Leptotrichus Panzerii: BUDDE-LUND 1885: 193 (Egypt, Algeria, Corsica, Spain); – AUBERT & DOLLFUS 1890: 9 (France); – DOLLFUS 1892 a: 195; – ?DOLLFUS 1892 b: 13 ("Syrie", "Ramleh" = ?Egypt, Alexandria, suburb Er-Raml = Ramleh; identification needs confirmation); – BUDDE-LUND 1896: 41 (Crete, identification doubtful); – ?ARCANGELI 1914 a: 17 (Ródhos, identification doubtful); – ARCANGELI 1914 b: 477 (Italy); – non ARCANGELI 1934: 47 (= *L. naupliensis* or *L. kosswigi*); – non ARCANGELI 1937: 84 (= *L. naupliensis or* L. kosswigi); ARCANGELI 1947: 104; – ARCANGELI 1950: 120; – ARCANGELI 1952: 133 (Italy); – ARCANGELI 1957: 90 (islands Lampedusa and Linosa); – ARCANGELI 1958: 53 (Madeira), 93 (Canary Islands).
Leptotrichus Panzeri: SIMON 1885: 15 (Tunisia); – BORRE 1886: 113 (Portugal); – DOLLFUS 1893: 55 (Canary Islands); – KRAEPELIN 1895: 16 (Canary Islands); – DOLLFUS 1896: 542 (Morocco, Tunisia, Algeria); – DOLLFUS 1906: 33 (Adriatic, Tremiti Islands); – ?BUDDE-LUND 1909 b: 5 (Egypt; identification needs confirmation); – ARCANGELI 1924: 17 (Sardinia, Spain); – PAULIAN DE FÉLICE 1939: 192, 212 (Morocco); – VANDEL 1954 c: 74.
Leptotrichus panzeri: CECCONI 1908: 9; – VERHOEFF 1908 a: 182; – VERHOEFF 1908 b: 369, figs. 49, 50, 54 (Sicily); – VERHOEFF 1930: 572 (Italy); – VERHOEFF 1933 a: 51 (Italy); – STROUHAL 1937 a: 62; non STROUHAL 1937 c: 84 (Greece: island Karpathos = *L. naupliensis* or *L. kosswigi*); – VERHOEFF 1940: 106, 111, 114, 119 (Italy, Croatia); – STROUHAL 1942: 149 (Greece: island Kálamos); – VERHOEFF 1942: 459, 467, 473, 479; – VERHOEFF 1944: 106, 111–112 (Italy); – JOLIVET 1953: 554 (Cabrera Island S Mallorca); – VANDEL 1953: 48 (Spain); – VANDEL 1954 a: 467–468 (Cape Verde Islands); – VANDEL 1954 b: 4 (Canary Islands); – STROUHAL 1954: 598; – VANDEL 1960: 51 (Madeira); – VANDEL 1961: 256 (island Menorca); – VANDEL 1962: 645, figs. 317, 318 A–G (France); – KARAMAN 1966: 391 (Yugoslavia); – VANDEL 1968: 16 (Azores: island Sâo Miguel); – CARUSO 1968: 359 (islands around Sicily); – VANDEL 1969: 25 (Sicily); – SCHMÖLZER 1971: 57, 91, 114, 118, 147 (Spain, Morocco); – SCHULTZ 1972: 89, figs. 7 G–J (not 5 G–K!) (Bermuda); – non SCHMALFUSS 1972 a: 44 (Crete = *L. naupliensis*); non SCHMALFUSS 1972 b: 592 (Greece: islands Kárpathos and Ródhos = *L. naupliensis* or *L. kosswigi*); – CARUSO 1973 a: 86 (islands around Sicily); – CARUSO 1973 b: 2, 9; – KHEIRALLAH 1973: 371 (Egypt: Alexandria; identification needs confirmation); – CARUSO 1974: 136, 148 (islands Lampedusa and Linosa); – ?KHEIRALLAH 1975: 217 (Egypt: Alexandria; identification doubtful); – non SCHMALFUSS 1975: 41 (Greece: island Thásos = *L. spinosus* n.sp., see chapter 3.5); – CARUSO 1976: 116 (island Pantelleria); – CARUSO & LOMBARDO 1976: 226 (island Ustica); – VANDEL 1977: 390 (St. Helena); – CARUSO & COSTA 1978: 447 (Sicily); – FERRARA & TAITI 1978: 60, 90, 93 (Italy:

Argentario and islands Elba, Pianosa, Giglio and Giannutri); – FERRARA & TAITI 1979: 129; – SCHMALFUSS 1979: 20 (Greece, except the record from Thásos which is *L. spinosus* n.sp., see chapter 3.5); – TAITI & FERRARA 1980: 281 (Italy: islands Capraia and Giannutri); – CARUSO 1982: 595 (Sicily); – CARUSO & LOMBARDO 1982: 24, 39, 43 (Malta islands); – SCHMALFUSS 1982: 131, 133 (Cape Verde Islands); – HOESE 1984: 31 (Canary Islands); – SCHMALFUSS & SCHAWALLER 1984: 11 (Greece: island Santoríni); – CARUSO et alii 1987: 156 (Sicily and Malta and surrounding islands); – CRUZ 1989: 91 (island Menorca); – CRUZ 1991: 95, 99 (Spain); – ARGANO & MANICASTRI 1991: 4 (islands around Sardinia); – MUCHMORE 1993: 32 (Virgin Islands: St. John); – GARCIA & CRUZ 1993: 326 (Cabrera Islands); – CARUSO & LOMBARDO 1995: 107 (only previously published records); – SFENTHOURAKIS 1996: 697 (Greece: Aegaean islands); – GARCIA & CRUZ 1996: 88 (Balearic Islands).

Leptotrichus panzerii: STROUHAL 1929 a: 81; – STROUHAL 1936 a: 168 (Greece: island Levkádha); – STROUHAL 1936 c: 87; – STROUHAL 1960: 93; – VERHOEFF & STROUHAL 1967: 483; – STROUHAL & PRETZMANN 975: 640; – ?KHEIRALLAH 1980 a: 71, 72, 73 (Egypt: Alexandria; identification doubtful); – ?KHEIRALLAH 1980 b: 393 (Egypt: Alexandria; identification questionable); – TAITI & FERRARA 1995: 186 (Italy: Tuscany); – ARGANO & MANICASTRI 1995: 286, 287, 288, 289, 292, 295 (islands around Sardinia); – TAITI & FERRARA 1996: 505 (Corsica); – SCHMALFUSS 1999: 7 (Greece: island Kefaloniá).

Euleptotrichus Panzeri: BRIAN 1932: 341 (Libya: oasis Kufra).

Recorded distribution (see chapter 3.3., map fig. 55): Coastal regions of the Mediterranean Sea (but also from Kufra oasis), apparently missing in the northeastern part (no records from Turkey, Cyprus, Syria, Lebanon, Israel), Atlantic coast of Morocco and Spain, Azores, Madeira, Canary Islands, Cape Verde Islands, Bermuda, Virgin Islands, introduced in St. Helena Island (southern Atlantic).

6a. *Leptotrichus pilosus pilosus* Dollfus, 1905

Leptotrichus pilosus: DOLLFUS 1905: 163, 176, fig. 7 (3 figs.) (Cyprus: Famagusta).

Leptotrichus pilosus pilosus: VANDEL 1965: 824, fig. 2.

Leptotrichus (Leptotrichus) pilosus pilosus: STROUHAL 1960: 92, 104, figs. 11–13 (Cyprus); – STROUHAL 1968: 330 (Cyprus).

Recorded distribution (map fig. 68): Cyprus.

6b. *Leptotrichus pilosus dobrogicus* Radu, 1973

Leptotrichus (Leptotrichus) pilosus dobrogicus: RADU 1973: 91, figs. 1–8 (26 figs.) (Romania); – RADU 1985: 115, figs. 80–84 (Romania).

Recorded distribution (map fig. 68): Romania, coast of Black Sea.

6c. *Leptotrichus pilosus medius* Verhoeff, 1941 (chapter **3.4.**)

Leptotrichus medius: VERHOEFF 1941: 245, 264, figs. 31–33 (p. 261) (Turkey: western Anatolia); – VERHOEFF 1943: 25; – VANDEL 1955: 499 (Lebanon).

Leptotrichus (Leptotrichus) pilosus medius: STROUHAL 1960: 92, 105, figs. 15–20 (Turkey: western Anatolia and NW Lake of Van).

Leptotrichus pilosus medius: VERHOEFF & STROUHAL 1967: 483; see below, chapter 3.4.

Recorded distribution (see chapter 3.4., maps figs. 68–69): Northern Aegean islands of Lésvos (Greece) and Gökçe Ada (Turkey), western Anatolia (Afyon, Bolu, Ankara), eastern Turkey NW Lake of Van (Nazik Gölü) and Lebanon (Bekaa Plain).

6d. *Leptotrichus pilosus mesopotamicus* Frankenberger, 1939

Leptotrichus mesopotamicus: FRANKENBERGER 1939: 27, figs. 6–11 (Iraq: Baghdad).
Leptotrichus (Leptotrichus) pilosus mesopotamicus: STROUHAL 1960: 92, 104, fig. 14 (SE-Turkey: near Siirt).

Recorded distribution (map fig. 68): SE-Turkey (Siirt) and Iraq (Baghdad).

Leptotrichus pittieri Pearse, 1921 = ***Trichorhina pittieri***

Leptotrichus pittieri: PEARSE 1921: 460, fig. 1 (Venezuela); – VAN NAME 1925: 486, figs. 37–42 (Guyana).

Remarks: ARCANGELI (1930 b: 3) realized that this species is a member of the genus *Trichorhina.*

Leptotrichus politus Omer-Cooper, 1923 = ***L. naupliensis*** (see VANDEL 1962: 645)

Remarks: I have examined type material of *L. politus* (see chapter 3.2.) and I can confirm VANDEL's (1962: 645) contention of *L. politus* being a synonym of *L. naupliensis.*

Leptotrichus squamatus Budde-Lund, 1885 = ***Niambia squamata***

Leptotrichus squamatus: BUDDE-LUND 1885: 196 (South Africa).
?*Leptotrichus squamatus:* DOLLFUS 1898: 125 (Senegal, probably a different species of *Niambia*).
Remarks: BUDDE-LUND (1909 a: 60) transferred the species to the genus *Niambia.*

7. *Leptotrichus spinosus* n.sp. (chapter **3.5.**)

Recorded distribution (see map fig. 69): Greece, northern Aegean, island Thásos.

8. *Leptotrichus subterraneus* Verhoeff, 1933

Leptotrichus subterraneus: VERHOEFF 1933 b: 111 (Jerusalem); – VERHOEFF & STROUHAL 1967: 483; – STROUHAL & PRETZMANN 1975: 639.

Recorded distribution: Jerusalem.
Remarks: It has yet to be clarified whether this form, described on females only, is a separate species or a variant of *L. naupliensis.* I have checked numerous samples of *Leptotrichus* from Israel (collection WARBURG, Haifa), but none of them could be identified as *subterraneus.*

9. *Leptotrichus syrensis* (Verhoeff, 1902) (chapter **3.5.**)

Porcellio syrensis: VERHOEFF 1902: 255 (Greece: Aegean island Síros).

Leptotrichus (Euleptotrichus) syrensis: VERHOEFF 1908 a: 182; – VERHOEFF 1908 b: 370, plate XXX, figs. 47–48, plate XXXI, figs. 58, 60, 70.
Leptotrichus syrensis: VERHOEFF 1923: 223; – STROUHAL 1929 a: 82; – STROUHAL 1937 c: 225; – VERHOEFF 1941: 264; – VERHOEFF 1943: 25; – SCHMALFUSS 1979: 20 (Greece: Aegean island Síros); – SFENTHOURAKIS 1994: 104 (Greece: Aegean islands Ándhros, Sámos, Síros, Sífnos, Mílos); – SFENTHOURAKIS 1996: 697; – SCHMALFUSS 1999: 6 (Greece: Aegean island Límnos).
Leptotrichus byrensis [sic, printing error]: VERHOEFF 1941: 245 (Turkey: SW-Anatolia).
Leptotrichus syrensis anatolicus: STROUHAL 1960: 93, 108, figs. 21–31 (Turkey: SW-Anatolia); VERHOEFF & STROUHAL 1967: 483.
Leptotrichus syrensis syrensis: STROUHAL 1960: 93; – VERHOEFF & STROUHAL 1967: 483.

Recorded distribution (see chapter 3.5. and map fig. 93): Aegean islands and southern Asia Minor.

Leptotrichus tauricus Budde-Lund, 1885 = nomen dubium

Leptotrichus Tauricus: BUDDE-LUND 1885: 194 (Crimea); – DOLLFUS 1892 b: 13 (Syria and Jerusalem; these specimens very probably belong to *L. naupliensis,* see also STROUHAL & PRETZMANN 1975: 636).
Leptotrichus tauricus: DOLLFUS 1894: 3 ("Jaffa, Jéricho"; – also these specimens, identified as *tauricus* with a question-mark by DOLLFUS, should be *L. naupliensis*); – VERHOEFF 1908 a: 182; – ARCANGELI 1936 b: 270 (Jerusalem, juvenile male probably belonging to *L. naupliensis*); – STROUHAL 1960: 93; – BORUTZKY 1972: 193.

Remarks: The description of *L. tauricus* fits for every species of the genus, no figure of any diagnostic character exists; thus only a redescription of the types would clarify the situation. Attempts to receive type-material on loan were not successful.

3. The Greek species of *Leptotrichus*

3.1 *Leptotrichus kosswigi* Strouhal, 1960 (figs. 2–25 and map fig. 1)

Material examined

Lectotype, herewith designated: ♂ (9.0×4.7 mm, antenna, pereiopods I–VII and pleopod I–II as slide preparation, figs. 6+7 in STROUHAL 1960 refer to this animal), S-Turkey, Iskenderun, leg. C. KOSSWIG IV. 1946 (NMW, STROUHAL 1960).
Paralectotype: ♀ with marsupium (9.2×4.5 mm), collecting data as lectotype (NMW, STROUHAL 1960).

Greece: 5 sp., E-Peloponnese, island Ídhra (= Hydra), leg. SCHMALFUSS 6.–9. IV. 1987 (SMNS 2155). – 1 ♂, central Aegean, island Síros, SW Ermúpoli, leg. PIEPER 5. III. 1971 (SMNS 1634, SCHMALFUSS 1975 as *L. naupliensis*). – 2 ♂♂, S-Aegean, island Santoríni, top of Mt. Profítis Ilías, 500–600 m, leg. RIEGER 30. V. 1991 (SMNS 2313). – 1 ♂, island Santoríni, Perissa, near beach, leg. RIEGER 25. V. 1991 (SMNS 2302). – 12 sp., island Santoríni, leg. BAEHR, HOFFMANN, SCHMALFUSS IV. 1978 (SMNS 1946, SCHMALFUSS & SCHAWALLER 1984). – 1 ♂, E-Aegean, island Kandheliúsa W Nísiros, leg. SCHMALFUSS 16. IX. 1971 (SMNS 1543, SCHMALFUSS 1975 as *L. naupliensis*). – 1 ♂, E-Aegean, island Sími N Ródhos, leg. PAULI & SCHMALFUSS 12. IV. 1981 (SMNS 1380). – 2 ♂♂, E-Aegean, island Ródhos, above town Ródhos and Butterfly Valley, leg. SCHMALFUSS 28.–30. III. 1967 (SMNS 1413 and 1402) (SCHMALFUSS 1972 b as *L. panzeri*). – 1 ♂, 1 ♀, island Ródhos, W town Ródhos, leg. SCHMALFUSS 13. V. 1976 (SMNS 1660, SCHMALFUSS 1979 as *L. naupliensis*). – 4 ♂♂, island Ródhos, Lárdhos Beach and Monólithos, leg. SCHAWALLER 30. III.–4. IV. 1980 (SMNS 1155 and 1159). – 6 sp.,

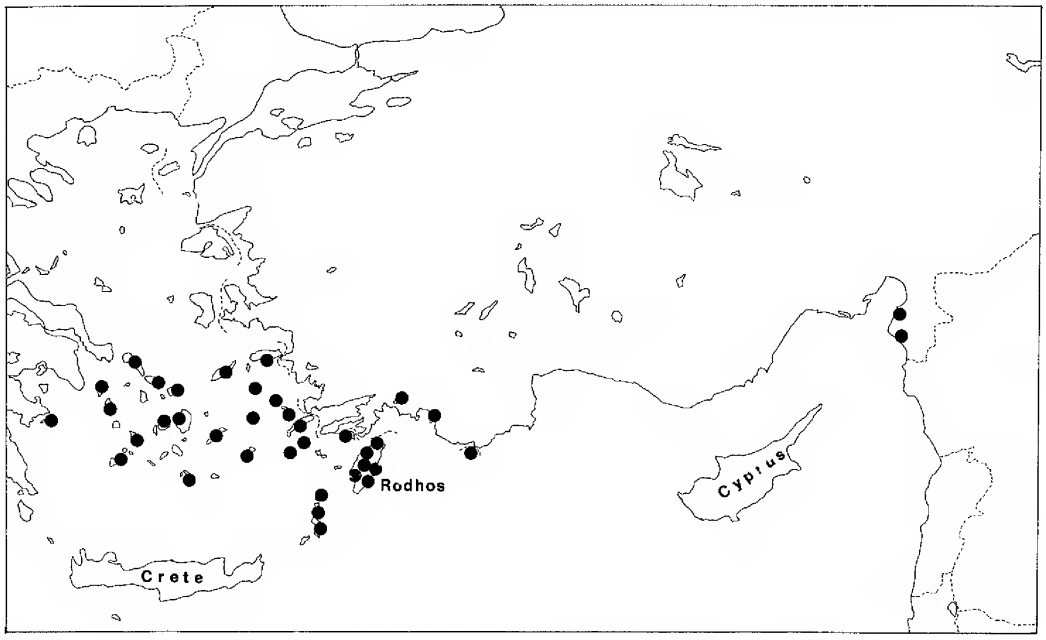


Fig. 1. Records of *Leptotrichus kosswigi* (Aegean islands and Turkish mainland).

island Ródhos, Monólithos and small islet in front of Líndhos, leg. PAULI & SCHMALFUSS 16.–21. IV. 1981 (SMNS 1387 and 1383). – 7 sp., island Ródhos, Theológos (beach), Yennádhi and Mt. Profítis Ilías (800 m, forest), leg. SCHMALFUSS 24. IV.–6. V. 1992 (SMNS 2320, 2323 and 2324). – 40 sp., island Ródhos, Monólithos (beach), Kalavárdha (beach) and Mt. Atáviros (800 m), leg. SCHMALFUSS 28.–29. IV. 1998 (SMNS 2638, 2639 and 2640). – 40 sp., E-Aegean, island Sariá N Kárpathos, Palátia, beach and canyon, leg. PIEPER & SCHMALFUSS 28. IV. 1983 (SMNS 1968). – 1 ♂, E-Aegean, island Kárpathos, Pigádhia, leg. SCHMALFUSS 18. IV. 1966 (SMNS 1073, SCHMALFUSS 1975 as *L. naupliensis*). – 1 ♂, island Kárpathos, Vanánta Beach N Dhiafáni, leg. SCHMALFUSS IV. 1982 (SMNS 1478). – 8 sp., island Kárpathos, Arkása, bank of freshwater stream, 100 m, leg. SCHMALFUSS 24. V. 1996 (SMNS 2537). – 1 ♂, 2 ♀♀, island Kastellórizo 130 km E Ródhos, leg. SCHMALFUSS 29. IV. 1992 (SMNS 2319).

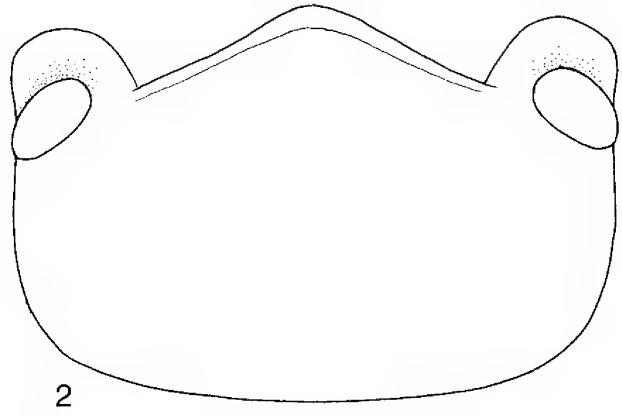
Turkey: 1 ♂, SW-Turkey, district Muğla, Köyçegiz, harbor, leg. SCHEUERN 6. III. 1977 (SMNS 11045). – 1 ♂ + slide preparation, S-Turkey, district Antakya (= Hatay), "Elma Dağı", leg. KOSSWIG II. 1942 (ZSM, VERHOEFF 1949 as *L. naupliensis*).

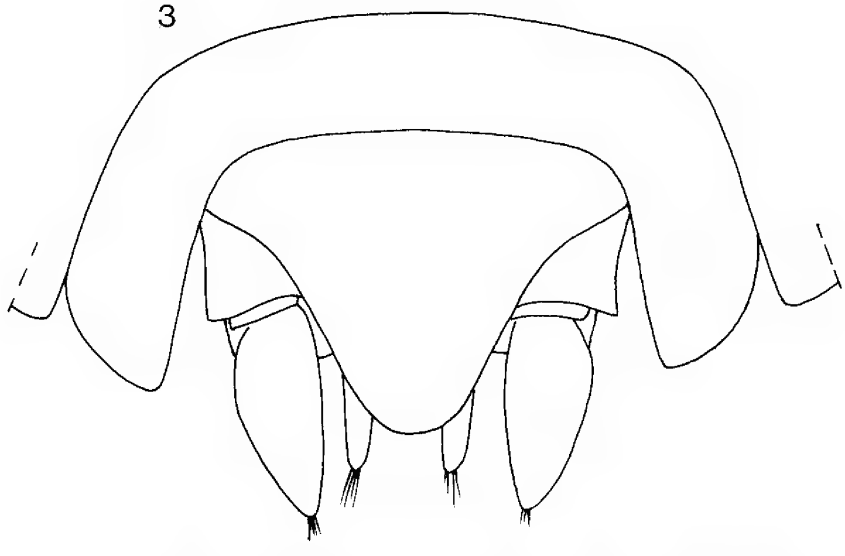
Further records

Greece: STROUHAL (1929 a: 82) gives figures of specimens from the island Míkonos which he identified at that time as *L. naupliensis;* they show however clearly that these specimens belong to the species which is here considered to be *L. kosswigi.* SFENTHOURAKIS (1994: 98 and 1996: 697) reports the species from the following Aegean islands: Kéa, Kíthnos, Sífnos, Mílos, Andhros, Tínos, Páros, Míkonos, Náxos, Amorgós, Astipaléa, Ikaría, Sámos, Pátmos, Léros, Kínaros, Levítha, Kálimnos, Kos, Kandheliúsa, Pergúsa, Yialí, Nísiros.

Turkey: SW-Turkey, Dalaman 60 km SE of Muğla (STROUHAL 1960); – SE-Turkey, Harbiye near Antakya (STROUHAL 1960).

Distribution see chapter 2 and map fig 1.





Figs. 2–3. *Leptotrichus kosswigi*, ♂, 11×5.6 mm, island Ródhos (SMNS 2638). – 2. Head in dorsal view; – 3. pleon-tergite V, telson and uropods in situ.

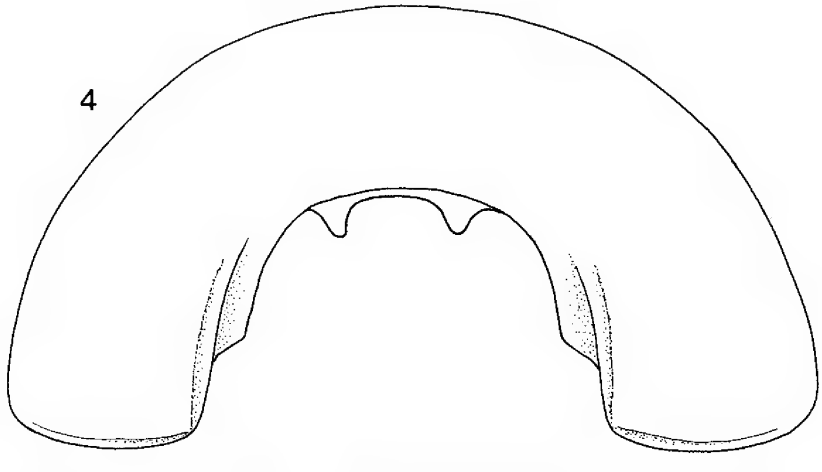
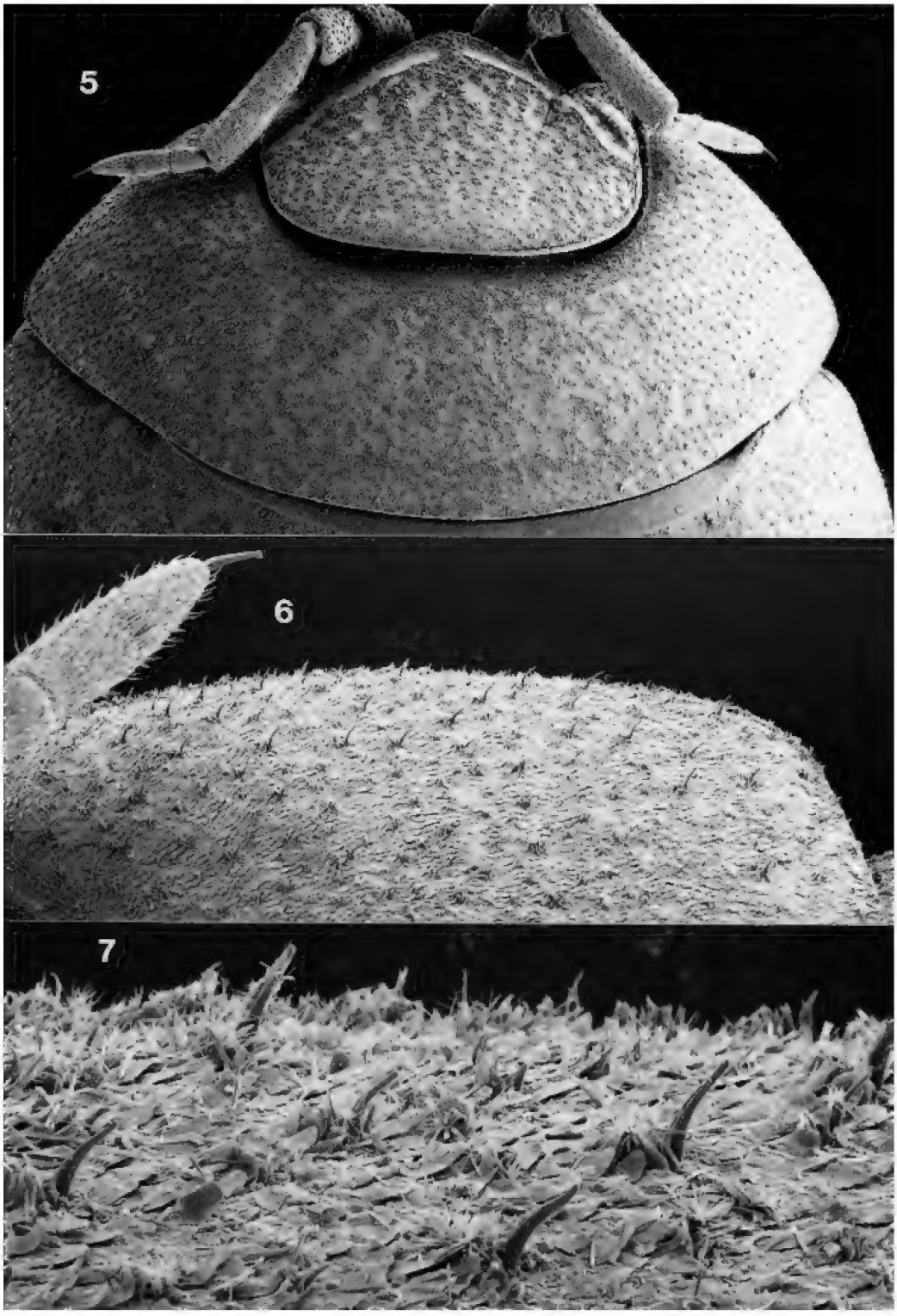
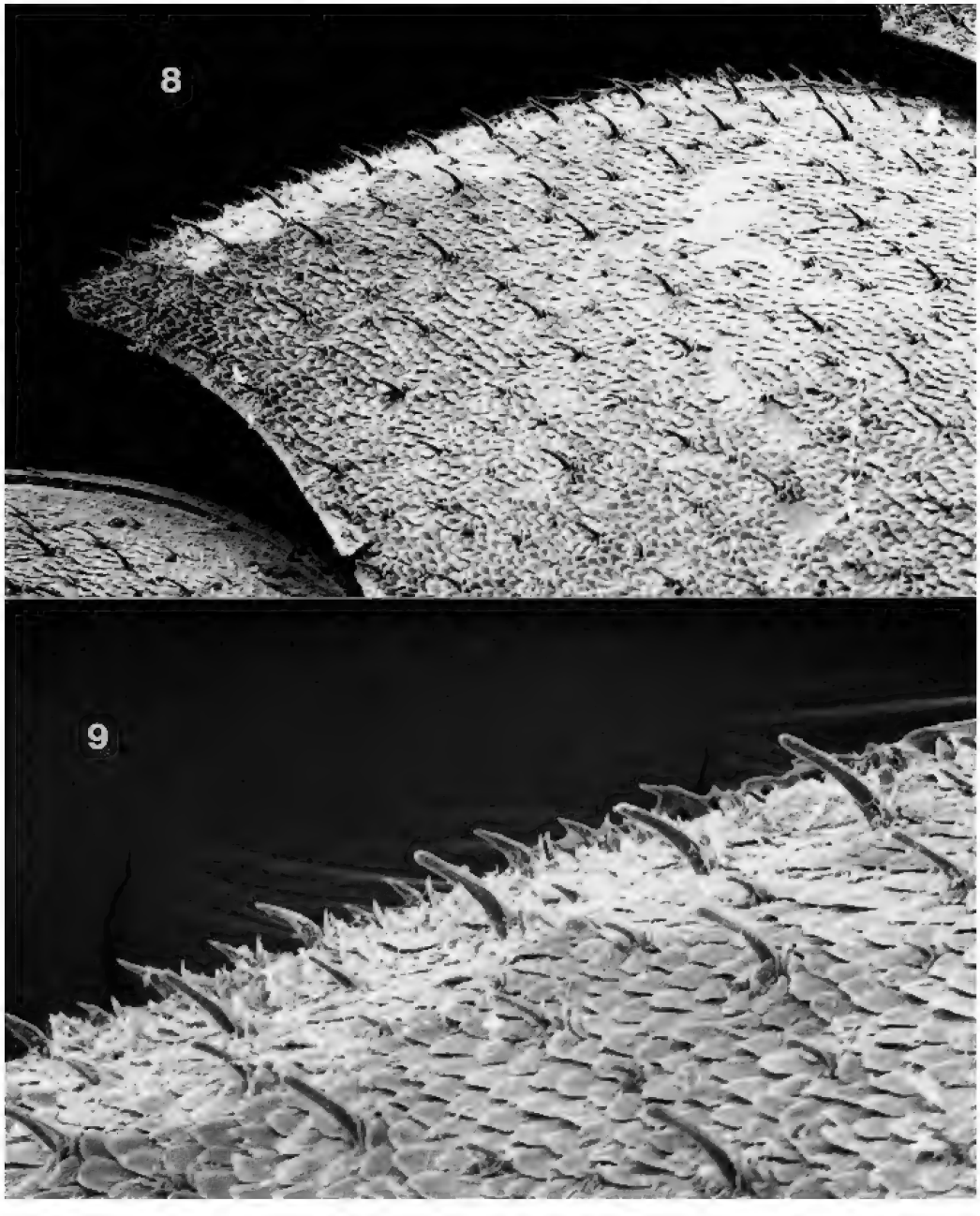


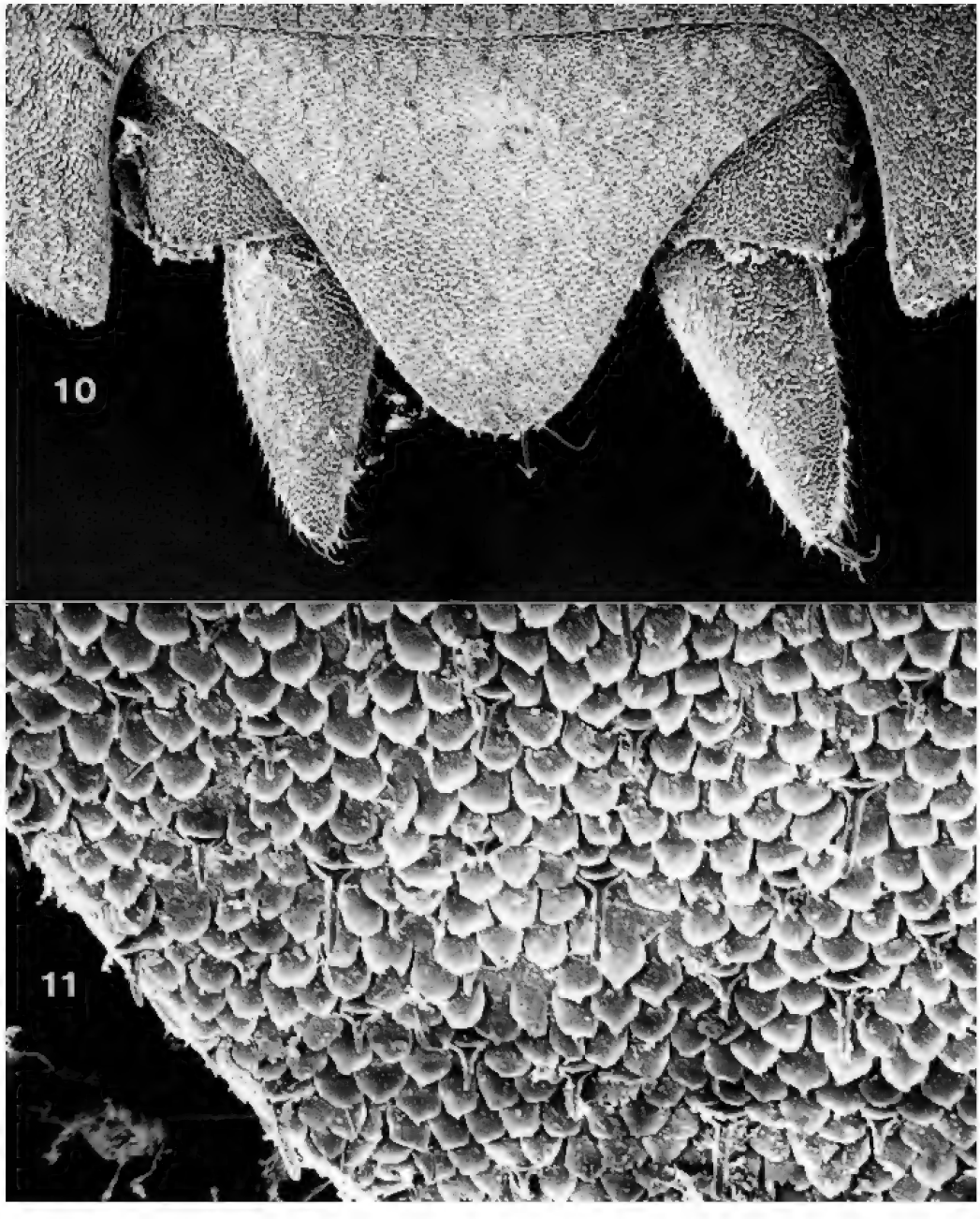
Fig. 4. Same specimen as before, pereion-tergite I, frontal view.



Figs. 5–7. *Leptotrichus kosswigi*, ♂, 8.5 mm long, island Saría (SMNS 1068), SEM, critical point preparation. – 5. Head and pereion-tergite I in dorsal view; – 6. and 7. margin of pereion-tergite I enlarged.



Figs. 8–9. *Leptotrichus kosswigi*, ♀, 7.5 mm long, island Santoríni (SMNS 1946), SEM, critical point preparation. – 8. Margin of pereion-tergite VII; – 9. same as before, enlarged.



Figs. 10–11. Same specimen as before. – 10. Telson and uropods in situ; – 11. part of telson enlarged.

Diagnostic characters

Maximum dimensions: 11.0×5.6 mm.

Coloration: Tergites light brown with usual yellowish muscle-spots, epimera lighter.

Cuticular structures: Tergites (as in all species of the genus) completely smooth (fig. 4), equipped with very small spiny setae (fig. 6–11).

Head with triangular median lobe (fig. 2) which is shorter than in *L. naupliensis,* not surpassing the side lobes which are wider than those of *L. naupliensis* (fig. 28). Pereion-epimera I with straight hind-margin, in adult males very slightly concave. Inner margins of pleon-epimera V diverging (fig. 3). Telson with slightly concave sides and rounded apex (figs. 3, 10), surface with impression.

Antenna II with distal joint of flagellum twice as long as proximal joint. Pereiopods I–IV in male with spine brushes (figs. 12–13). Male ischium VII frontally with a deep oblique groove, carpus VII without any trace of a ridge (figs. 14–15); the ischium seems to be inserted at a different angle from the one in *L. naupliensis.* Male pleopod-exopodite I with a short and narrow hind lobe (compared with *L. naupliensis*), but rather variable (figs. 16–18); in extreme cases the shapes of exopodite I of *L. kosswigi* and not fully grown *L. naupliensis* can overlap. Male pleopod-endopodites see figs. 23–24, pleopod-exopodites II–V see figs. 19–22, female pleopod-exopodite I see fig. 25. Uropod-exopodite shorter than telson, ratio exopodite:telson 2:3 (figs. 3, 10).

3.2. *Leptotrichus naupliensis* (Verhoeff, 1901) (figs. 28–54 and maps figs. 26–27)

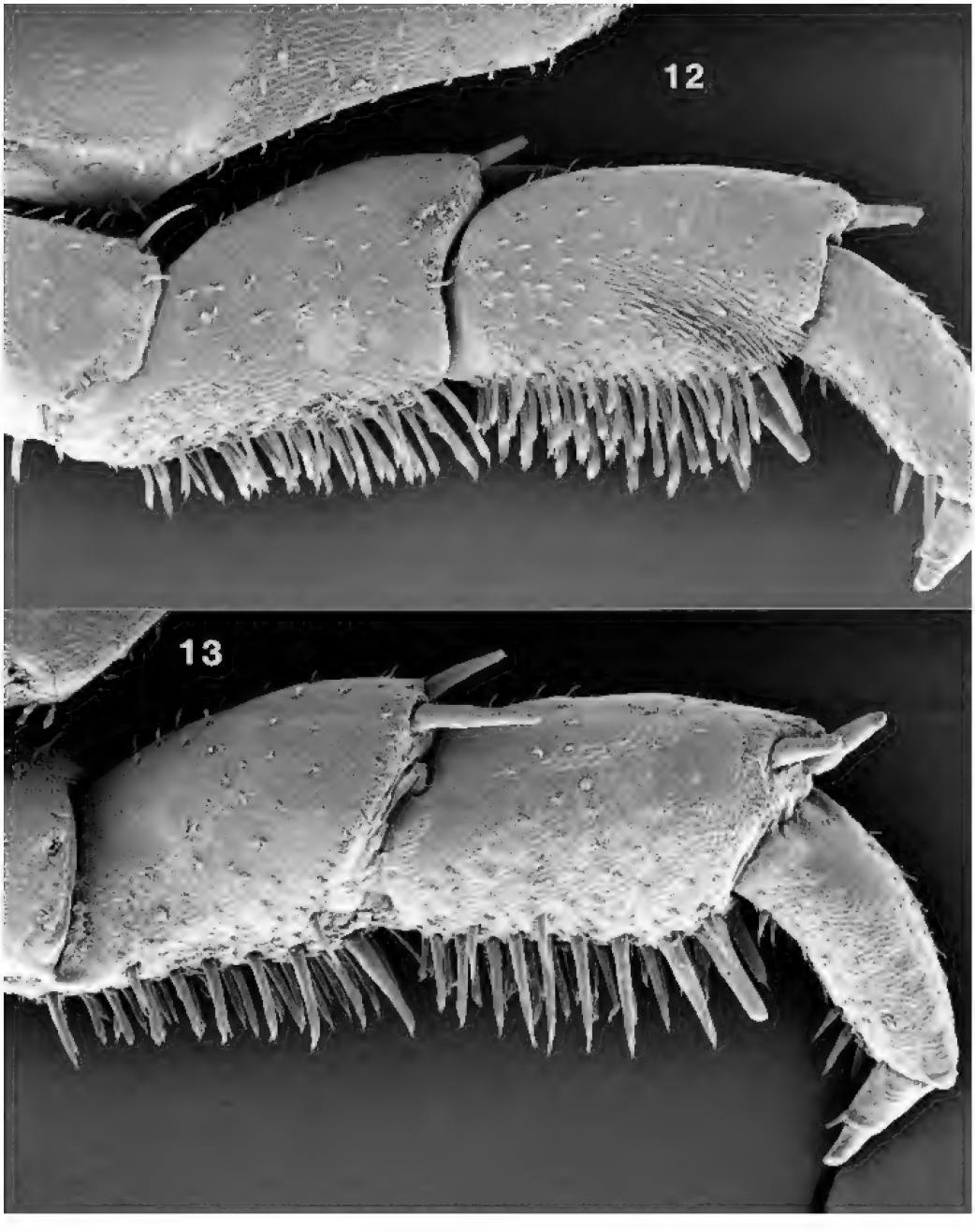
Material examined

Lectotype, herewith designated: ♂, 8 mm long, Greece, W-Peloponnese, Návplio (= Nauplia), leg. Verhoeff ±1900 (SMNS T54, Verhoeff 1901 as *Porcellio naupliensis*).

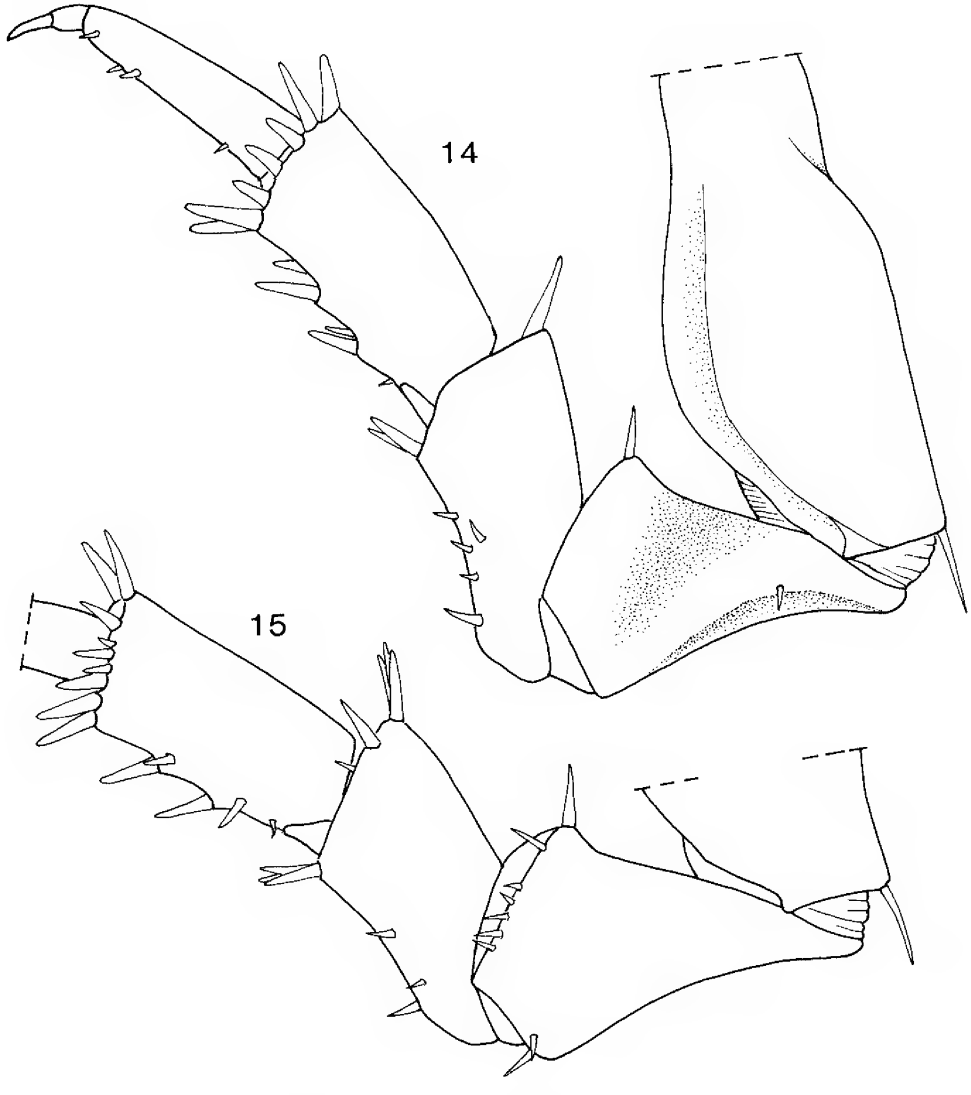
Paralectotype, herewith designated: ♀ without marsupium, 9 mm long, same data as lectotype (ZSM, Verhoeff 1901 as *Porcellio naupliensis*).

Italy: Slide preparation of male appendages (syntype of *L. ischianus*), island Ischia W Napoli, leg. P. + G. Buchner date? (ZSM, Verhoeff 1942). – 1 ♂, Calabria, Marina di Caulonia, leg. R. Grimm 22. V. 1982 (SMNS 7157).

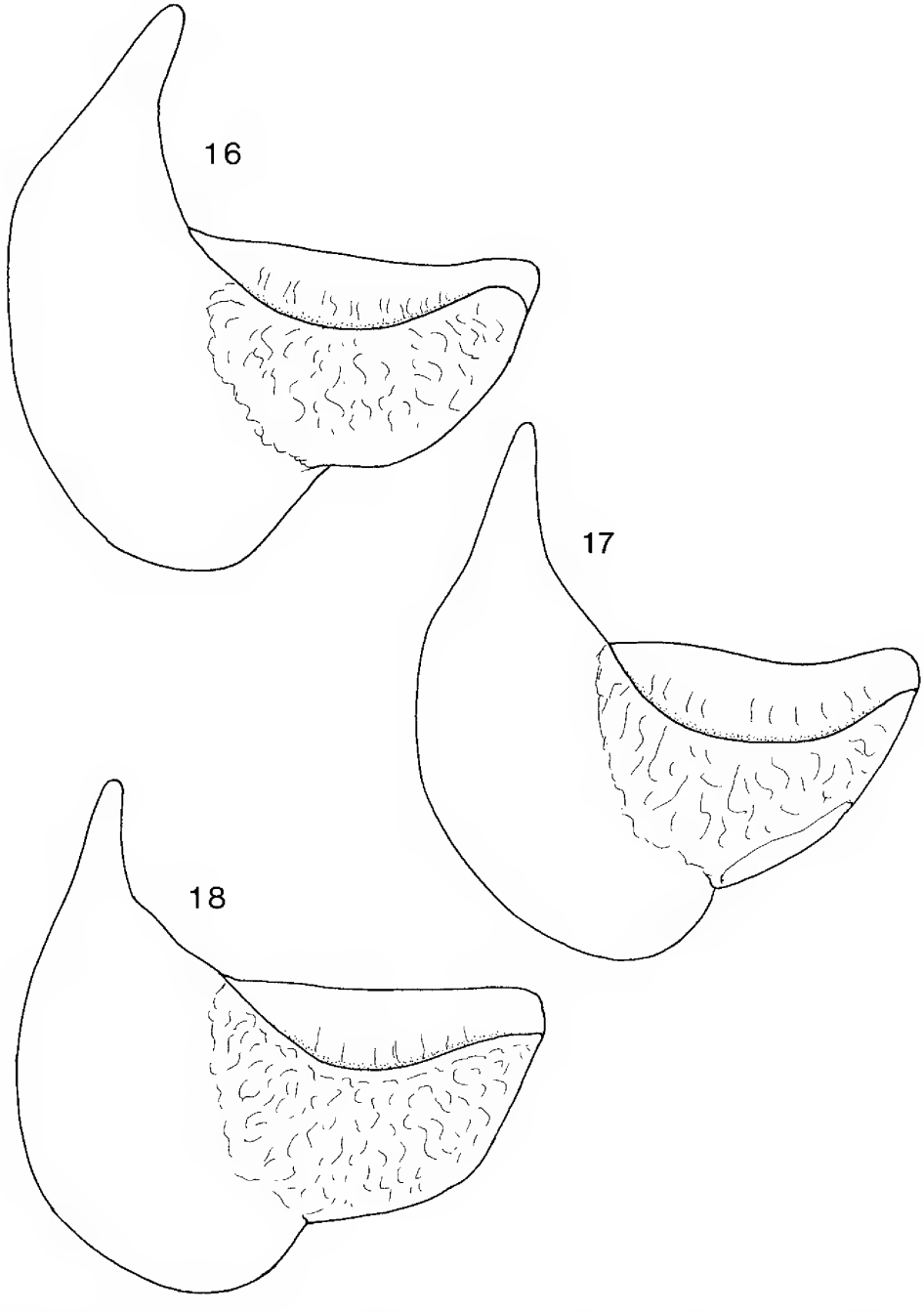
Greece: 2 sp., S-Aegean, island Mílos, Adámas, leg. Schmalfuss 23. IV. 1993 (SMNS 2342). – 7 sp., S-Aegean, island Ios, beach with limestone rocks, leg. Schmalfuss 9. V. 1991 (SMNS 2299). – 5 sp., S-Aegean, island Santoríni, leg. Schmalfuss IV. 1978 and IV. 1984 (SMNS 1946 and 2074, Schmalfuss & Schawaller 1984). – 1 ♂, S-Aegean, Crete, E Sitía, beach, leg. Reise & Spieth 18. III. 1970 (SMNS 1227, Schmalfuss 1972 a as *L. panzeri*). – 6 sp., Crete, Lake of Kúrna, sandy shore, leg. Malicky V. 1971 (SMNS 1280, Schmalfuss 1975). – 1 ♂, SE-Aegean, island Kásos, beach S Ayios Yióryios, leg. Schmalfuss 16. IV. 1983 (SMNS 1972). – 3 sp., island Kásos, freshwater spring near airport, leg. Schmalfuss 7. IV. 1983 (SMNS 1979). – 3 sp., SE-Aegean, island Armáthia N Kásos, leg. Schmalfuss 19. IV. 1983 (SMNS 1967). – 2 sp., SE-Aegean, island Kárpathos, islet Sókastro W Lévkos, leg. Schmalfuss 1. V. 1983 (SMNS 1982). – 6 sp., island Kárpathos, Lévkos, beach, leg. Schmalfuss 15. IV. 1982 (SMNS 1472). – 7 sp., island Karpathos, lagoon at southern tip of island, leg. Schmalfuss 20. IV. 1982 (SMNS 1449). – 24 sp., island Kárpathos, sandy beach W Pigádhia, along freshwater stream, leg. Schmalfuss 9. IV. 1982 (SMNS 1468). – 13 sp., SE-Aegean, island Tílos, leg. Schmalfuss 26. IV. 1998 (SMNS 2637). – 9 sp., SE-Aegean, island Sími, leg. Liebegott 12. X. 1980 (SMNS 1347). – 2 sp., SE-Aegean, island Ródhos, Kamíros, sandy beach, leg. Schawaller 10. IV. 1980 (SMNS 1152). – 1 ♂, island Kastellórizo 130 km E Ródhos, leg. Schmalfuss 1. V. 1992 (SMNS 2319).



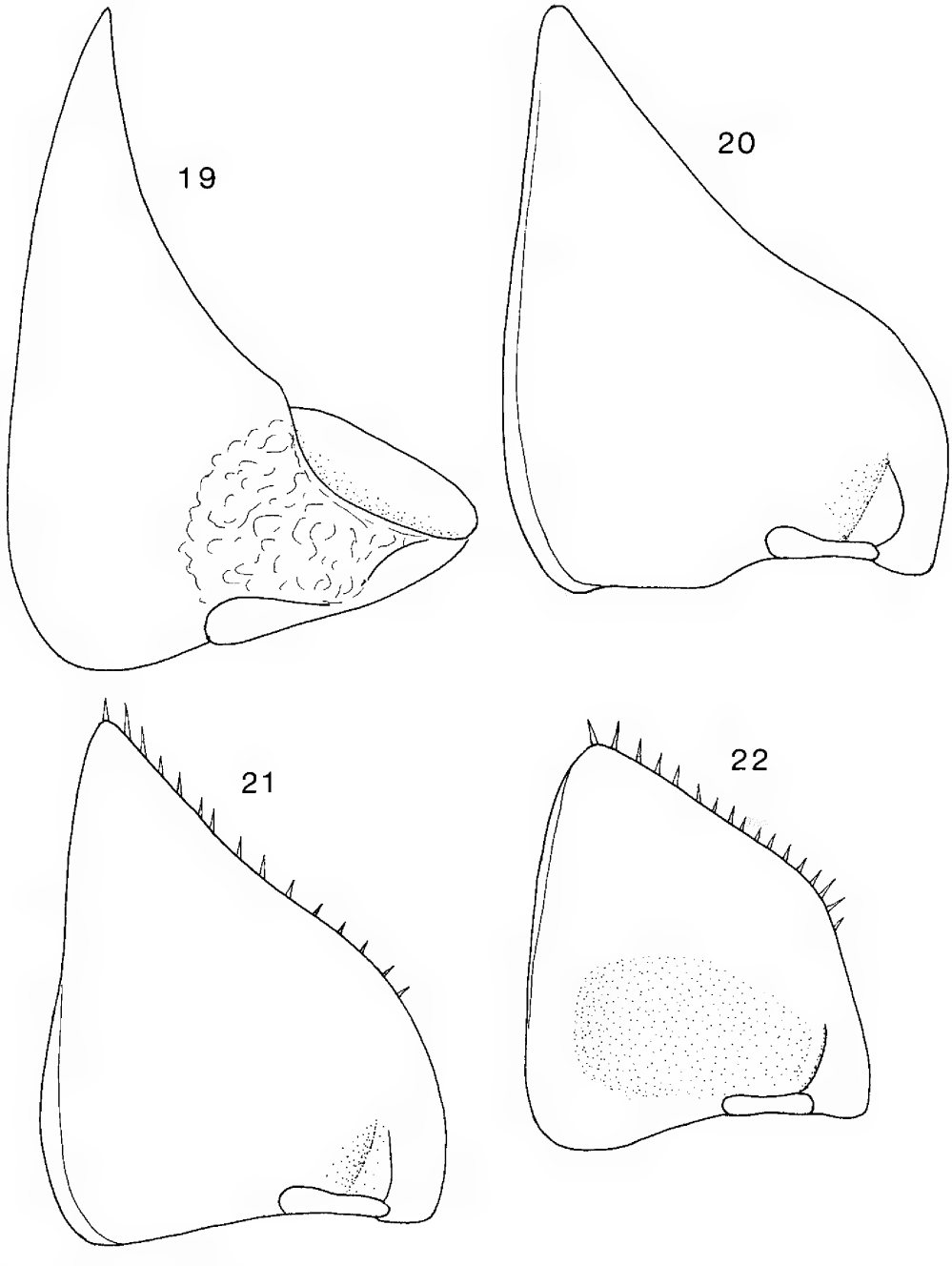
Figs. 12–13. *Leptotrichus kosswigi*, ♂, 11 mm long, island Ródhos (SMNS 2638), SEM, air-dried, pereiopod I in frontal and caudal view.



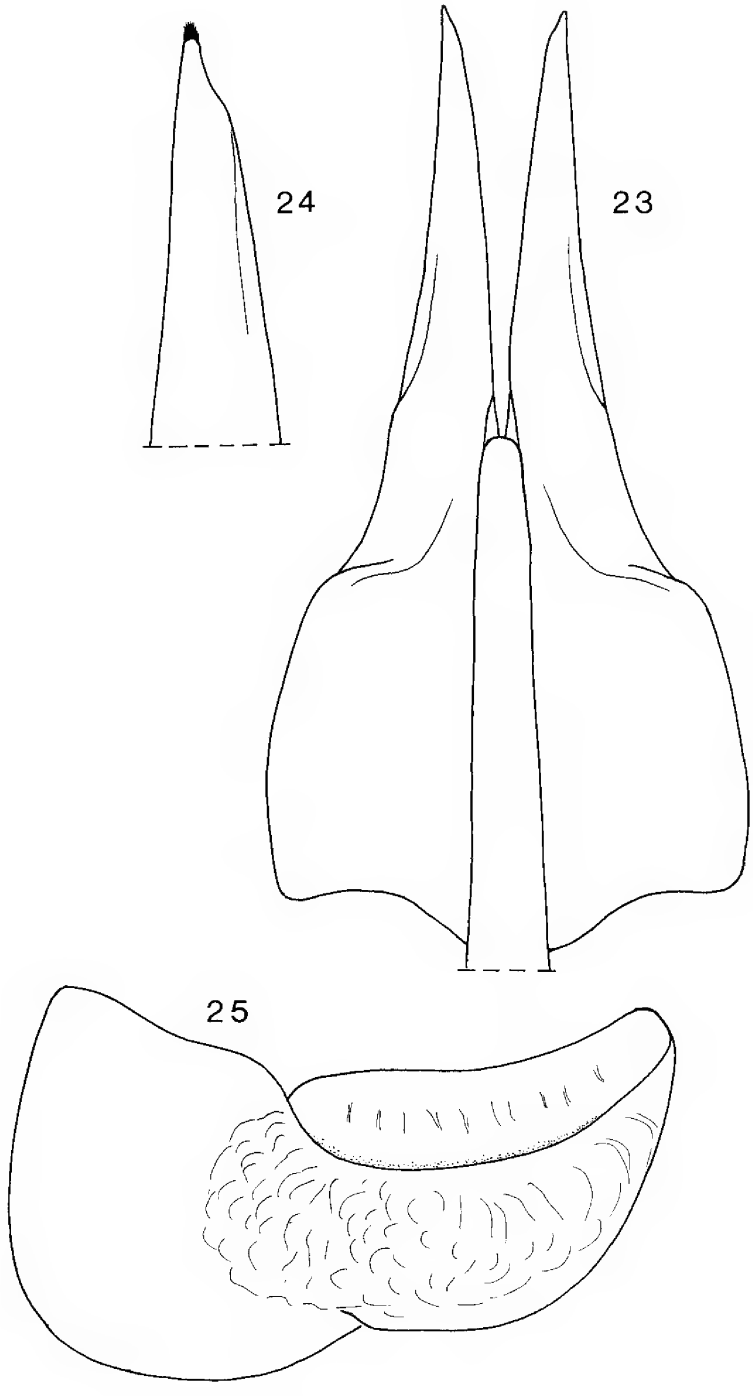
Figs. 14–15. As before, pereiopod VII in frontal and caudal view.



Figs. 16–18. *Leptotrichus kosswigi*, ♂♂, pleopod-exopodites. – 16. Lectotype, 9 mm long, Iskenderun (NMW); – 17. 7.5 mm long, island Síros (SMNS 1634); – 18. 8 mm long, island Saría (SMNS 1968).



Figs. 19–22. *Leptotrichus kosswigi*, ♂, 8 mm long, island Saría (SMNS 1968). – 19. Pleopod-exopodite II, dorsal side; – 20. pleopod-exopodite III, dorsal side, marginal spines on ventral side; – 21. pleopod-exopodite IV, dorsal side; – 22. pleopod-exopodite V, dorsal side.



Figs. 23–25. *Leptotrichus kosswigi.* – 23. ♂, 8 mm long, island Saría (SMNS 1968), pleopod-endopodites I, ventral view; – 24. as before, apex enlarged; – ♀, 10 mm long, island Ródhos (SMNS 1387), pleopod-exopodite I, dorsal side.

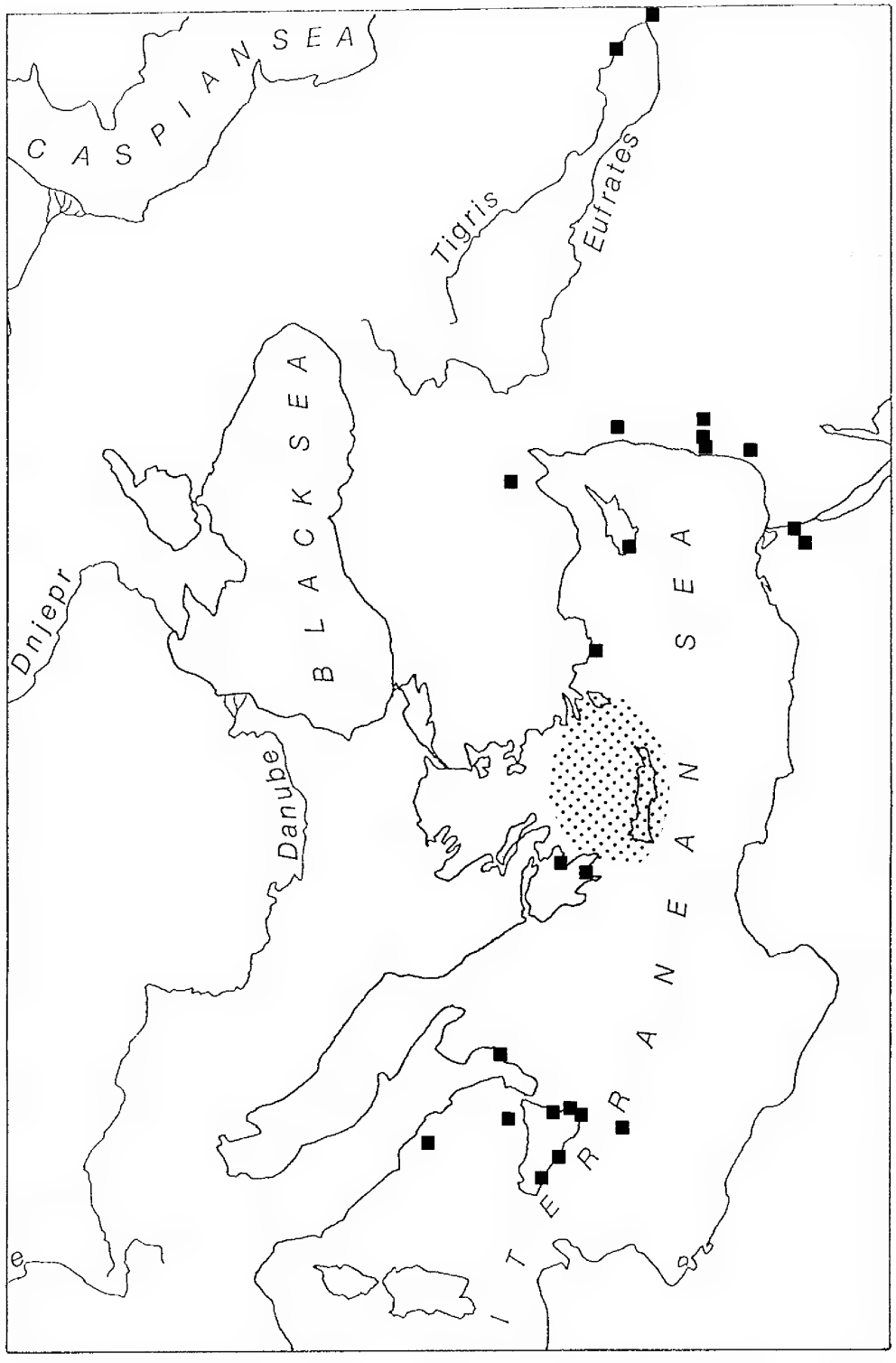


Fig. 26. *Leptotrichus naupliensis*, safe records, dotted area enlarged in fig. 27.

Turkey: Slide preparation of male appendages, S-Turkey, Pozanti 60 km NW Adana, leg. Kosswig & de Lattin date? (ZSM, Verhoeff 1941 as *L. naupliensis thermiensis*).

Cyprus: 2 sp., W-Cyprus, Moni Ayiu Neofitu N Pafos, leg. Grimm & Rachinsky 8. XII. 1988 (SMNS 11312). – 1 ♂, W-Cyprus, Páfos, leg. Grimm & Rachinsky XII. 1988 (SMNS 11301). – 1 ♂, W-Cyprus, district Páfos, Akamás Peninsula, Kalamúlis Gorge, 50–300 m, leg. Bartsch & Berg 19. III. 2000 (SMNS 11480).

Syria: 1 ♂, W-Syria, Krak de Chevaliers W Homs, leg. Scheuern 11. III. 1977 (SMNS 11051). – 2 sp., SW-Syria, 25 km N Deraa (Dar'a), leg. Kinzelbach et al. 25. III. 1977 (SMNS 11056).

Iraq: 3 ♂♂, 1 ♀ (syntypes of *L. politus,* with 9 slide preparations), Amara, leg. R. Tame XII. 1918 (NHML 1922:5:18:7–10, slide preparations 1922:5:18:35–43, Omer-Cooper 1923).

Israel: 1 ♂, SE Haifa, Mt. Carmel, monastery Muhraqa, 400 m, leg. Schawaller & Schmalfuss 8. II. 1987 (SMNS 11315). – 3 sp., SE Haifa, S Mt. Carmel, NW Elyaqim, 300 m, leg. Schawaller & Schmalfuss 8. II. 1987 (SMNS 11316). – 2 sp., Lower Galil, 3 km W Segev, 200 m, leg. Schawaller & Schmalfuss 9. II. 1987 (SMNS 11320). – 2 sp., Lower Galil, 15 km NW Nazareth, Ha Solelim, 200 m, leg. Schawaller & Schmalfuss 7. II. 1987 (SMNS 11317). – 3 sp., Lower Galil, SE Haifa, Allonim, 200 m, leg. Schawaller & Schmalfuss 7. II.1987 (SMNS 11314). – 11 sp., Gilboa Mts., SE Nurit, 400 m, leg. Schawaller & Schmalfuss 10. II. 1987 (SMNS 11318). – 1 ♂ + slide preparation of appendages, "Chuldah"? = Hulda 25 km SES Tel Aviv, leg. Aharoni date? (ZSM, Verhoeff 1923). – 1 ♂, N Qiryat Gat, S Tirosh, 150 m, leg. Schawaller & Schmalfuss 12. II. 1987 (SMNS 11321). – 2 sp., E Qiryat Gat, SW Bet Guvrin, 250 m, leg. Schawaller & Schmalfuss 12. II. 1987 (SMNS 11319).

Egypt: 10 sp., Ismailia (Suez Canal), leg. Beder 26. V. 1988 (SMNS 15438).

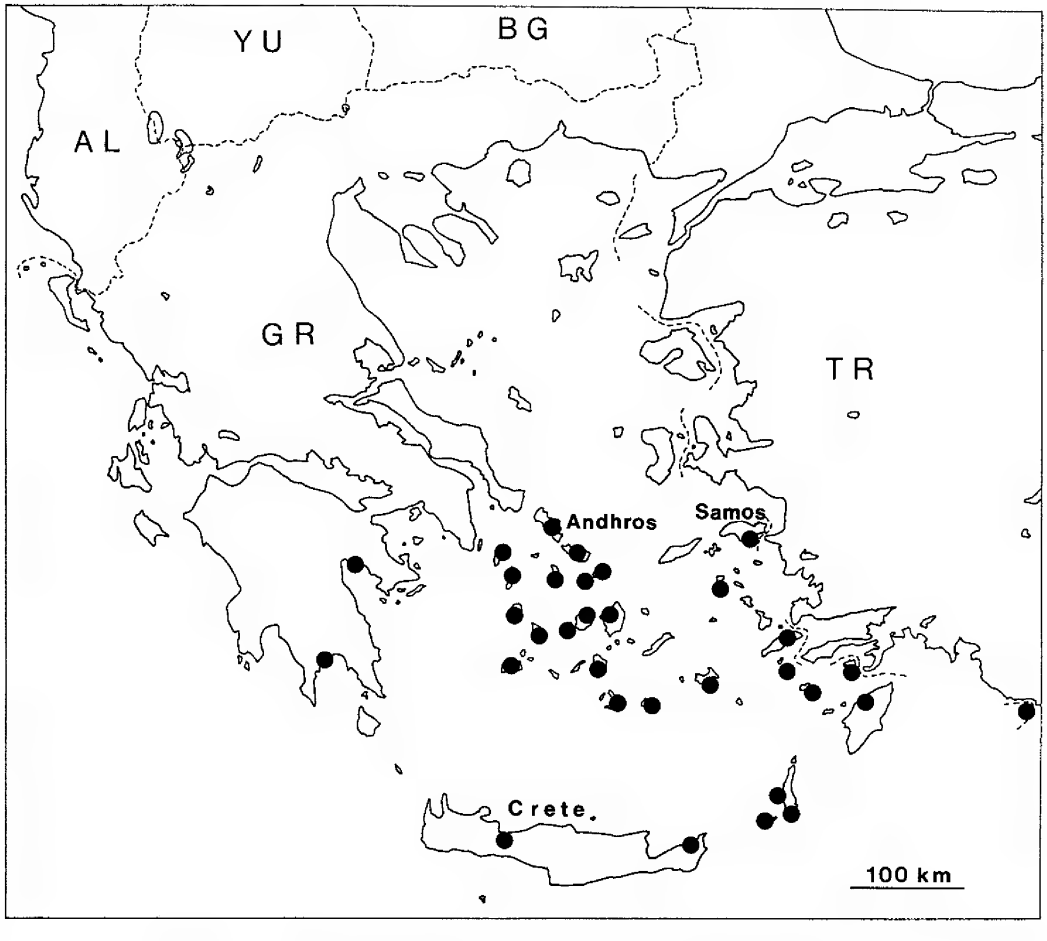


Fig. 27. *Leptotrichus naupliensis,* safe records from Greece.

Further safe records

Italy: Sicily and surrounding islands (VERHOEFF 1933 a, CARUSO 1968, VANDEL 1969, CARUSO et alii 1987); – Ischia (VANDEL 1965).
Malta: CARUSO & LOMBARDO 1982, CARUSO et alii 1987.
Greece: Peloponnese (STROUHAL 1938, 1960); – Aegean islands Kíthira, Antikíthira, Crete (SFENTHOURAKIS 1993), Kíthnos (STROUHAL 1936 b, 1937 c), Dhílos (STROUHAL 1960), 22 Cyclades islands (SFENTHOURAKIS 1994, 1996).
Cyprus: DOLLFUS 1905, VANDEL 1965, STROUHAL 1968.
Lebanon: VANDEL 1955.
Syria: RICHARDSON 1926.
Israel: VERHOEFF 1923, PRETZMANN 1974, STROUHAL & PRETZMANN 1975.
Iraq: Amara (OMER-COOPER 1923); Basrah (AHMED 1974).
Egypt: Cairo (STROUHAL 1960, EL-KIFL et alii 1971).

Distribution see chapter 2 and maps figs. 26–27

Diagnostic characters

Maximum dimensions: 10.0×5.0 mm.
Coloration: Darker or lighter brown mottled with yellowish.
Cuticular structures: Tergites smooth with short spiny setae (figs. 31–34) as in *L. kosswigi.*

Head with triangular rather pointed median lobe, forming a smaller angle than in *L. kosswigi* and surpassing the side-lobes (figs. 28, 30) which are narrower than in *L. kosswigi.* Pereion-epimera I with straight hind-margin (fig. 30). Inner margins of pleon-epimera V slightly converging (fig. 29), parallel or diverging. Telson with slightly concave sides and rounded apex (fig. 29), variability overlapping with *L. kosswigi.*

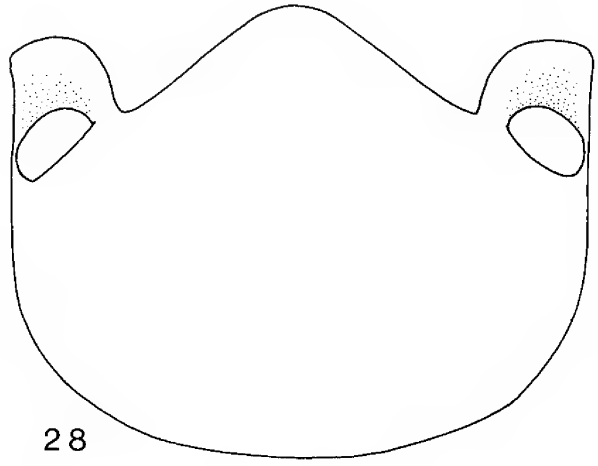
Antenna II with distal joint of flagellum 2.5 times as long as proximal joint. Mandibles see figs. 35–36. Pereiopods I–IV in male with spine brushes (fig. 37), in female with row of strong spines (fig. 38). Male pereiopod VI with basipodite narrower than in pereiopod VII (fig. 40, the same differences in the other species of the genus). Male pereiopod VII see figs. 41–42, ischium frontally with groove, insertion seemingly at different angle from that of *L. kosswigi;* carpus always with ridge of variable height and position, which are also depending on age and/or size (figs. 41–42, 44, 46, 48, compare figs. 14–16 in STROUHAL & PRETZMANN 1975: 637). Female pereiopod VII see fig. 39. Male pleopod-exopodite I in fully grown specimens with parallel-sided hind-lobe and the narrow apical part pointing medially, but the shape again exhibits a considerable variability, also depending on age and size (figs. 43, 45, 47, 49–50, see also figs. 17–22 in STROUHAL & PRETZMANN 1975: 637). Male pleopod-exopodites II–V see figs. 51–54. Uropod-exopodite shorter than telson (fig. 29).

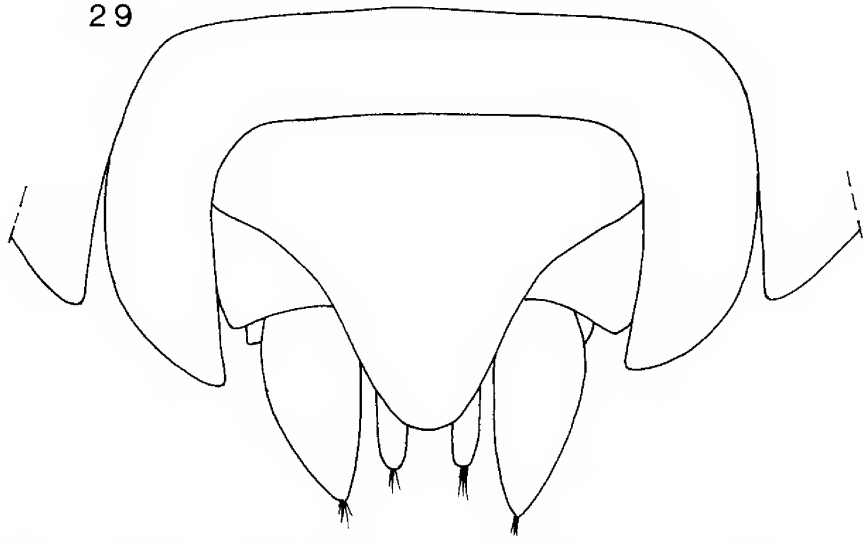
Remarks

Because of an insufficient original description the species has been misidentified many times and all subsequent records need re-examination. A very similar second species which occurs often syntopically with *L. naupliensis* was not separated until 1960 when STROUHAL described it as *L. kosswigi,* although he had already in 1929 figured the species but identified it as *L. naupliensis* (STROUHAL 1929 a: 82, figs. 19–23). The two species overlap in all characters except in the presence/absence of a

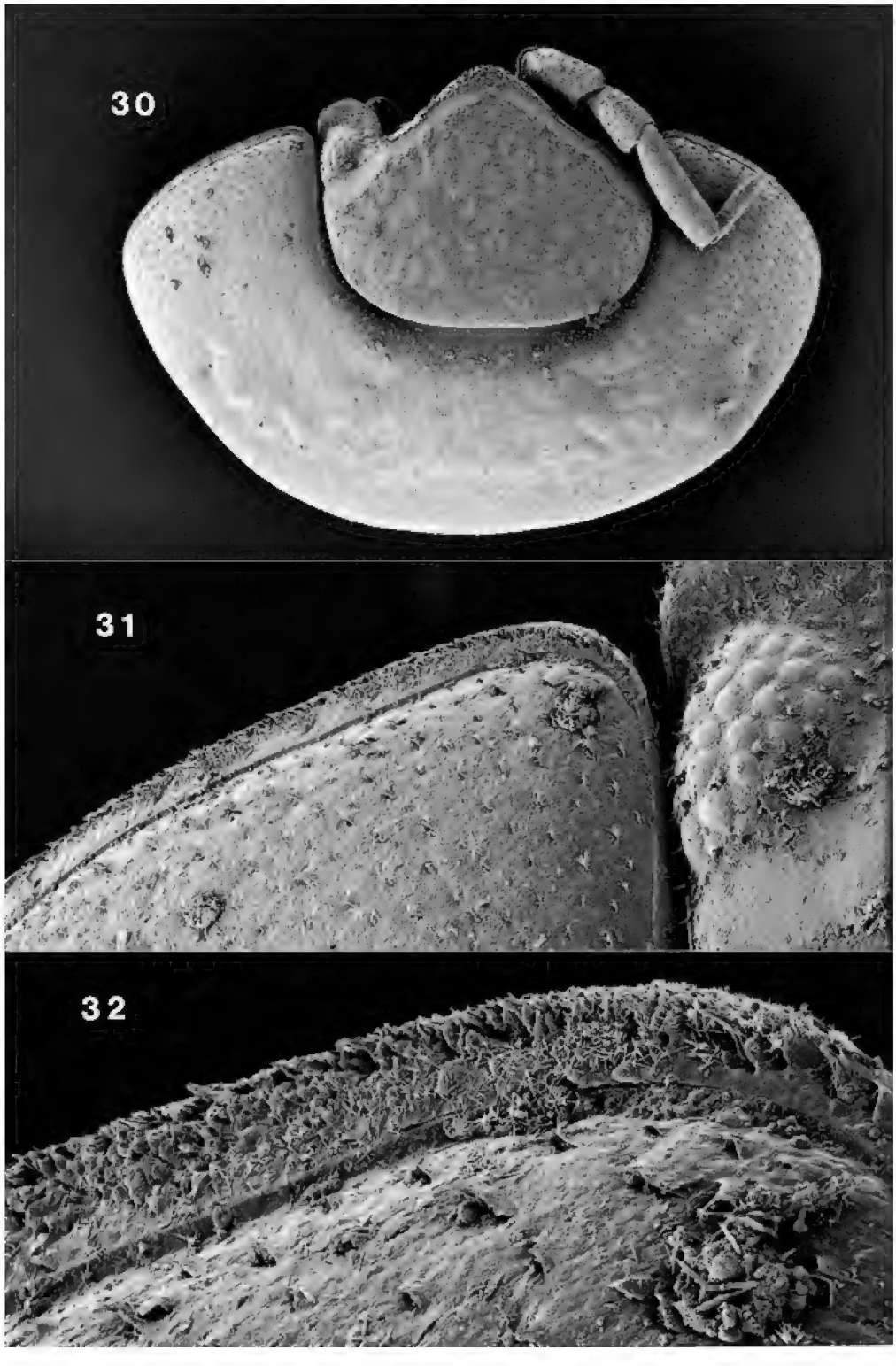
ridge in the male carpus VII and, as far as can be judged from the material examined, in the median lobe of the head. Note however that the carpal ridge is lacking in regenerated legs of *L. naupliensis*! The regenerated legs are smaller than the original counterparts and lack any pigmentation.

A re-examination of the types of *L. politus* from Iraq confirmed VANDEL (1962: 645) who synonymized this name with *L. naupliensis.* The pleopod-exopodite and the carpus VII of a syntype male are depicted in figs. 45 and 46. STROUHAL (1960: 92) in his key to the species of *Leptotrichus* claimed *L. politus* not to have a crest on the male carpus VII, but he had probably overlooked that OMER-COOPER figured the pereiopod VII of the female (1923: plate VI, fig. 11). Otherwise no differences concerning the diagnostic characters can be found between *politus* and *naupliensis.*

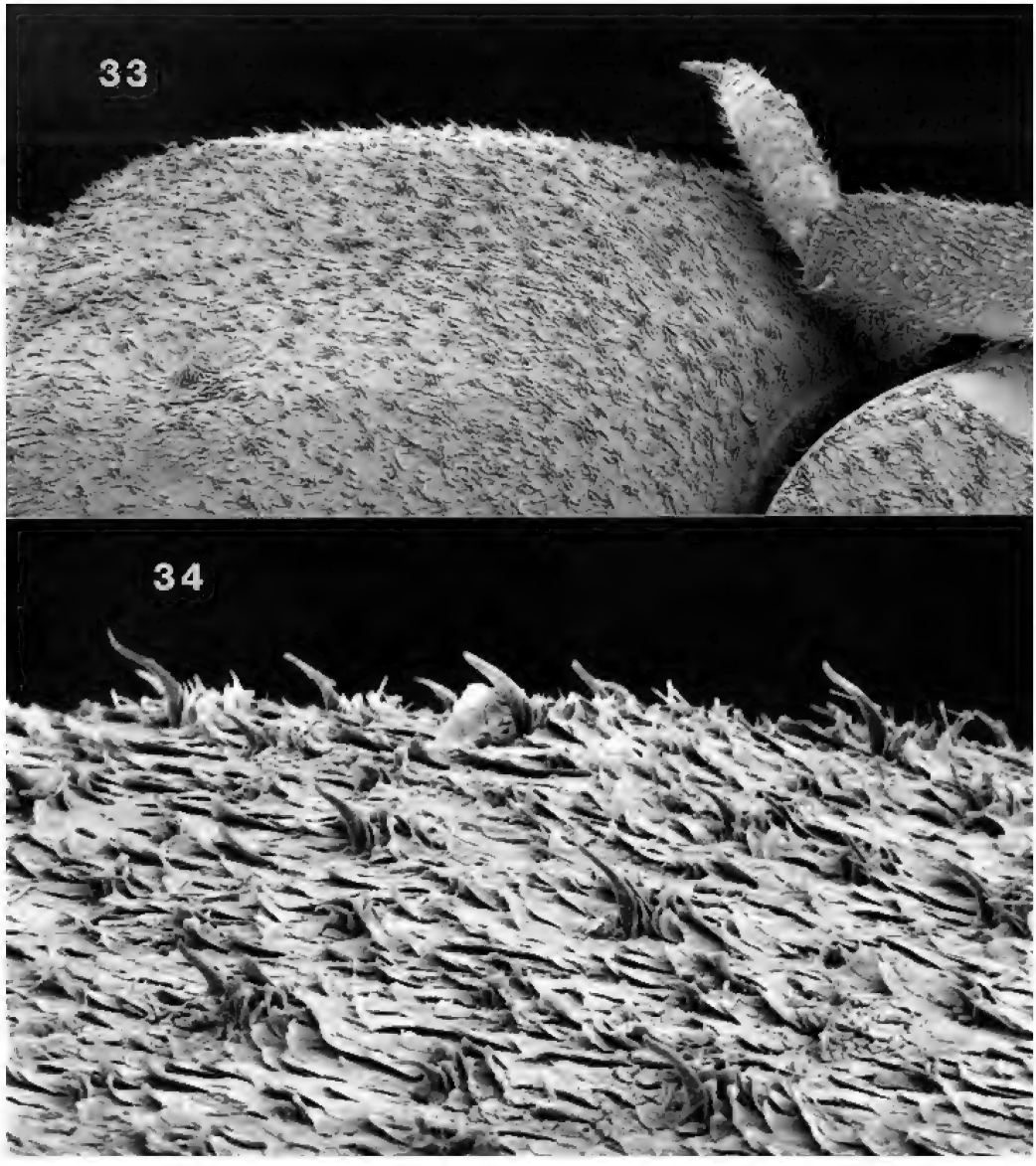




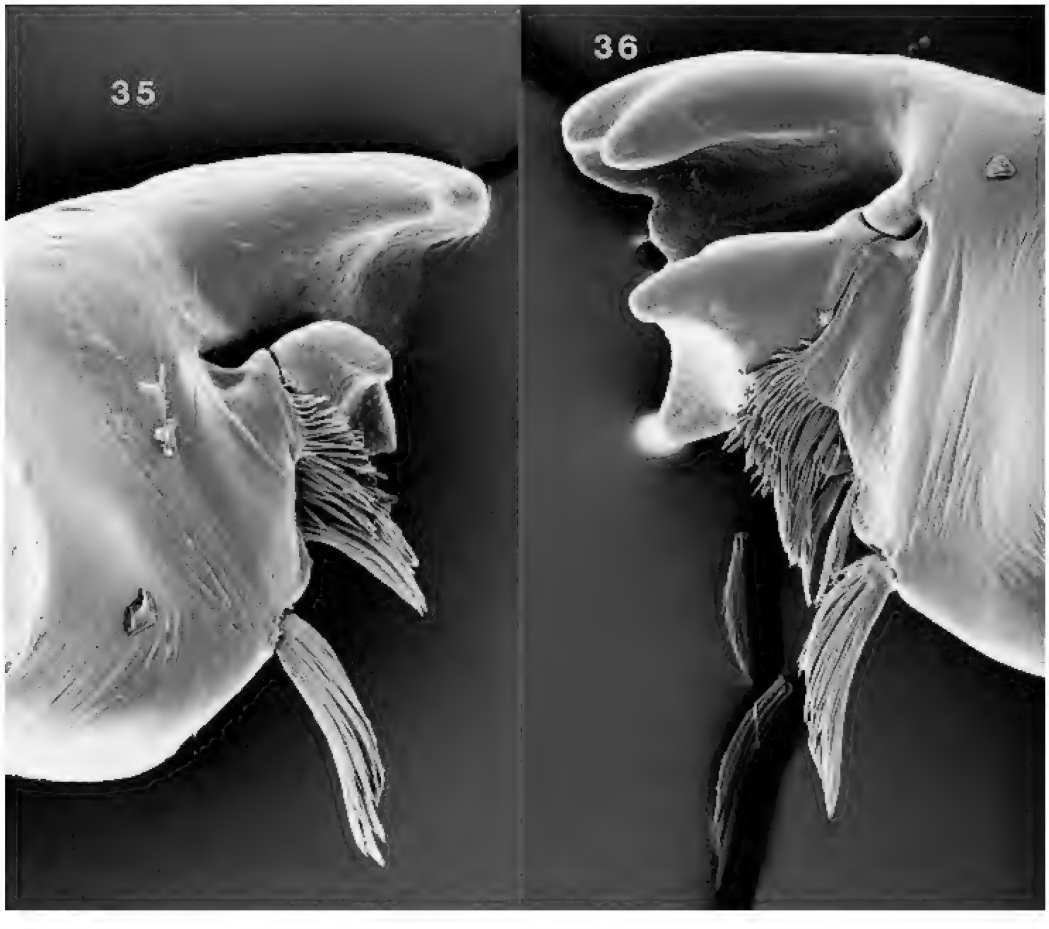
Figs. 28–29. *Leptotrichus naupliensis,* ♂, 10 mm long, island Santoríni (SMNS 2074). – 28. Head in dorsal view; – 29. pleon-tergite V, telson and uropods in situ, same scale as fig. 28.



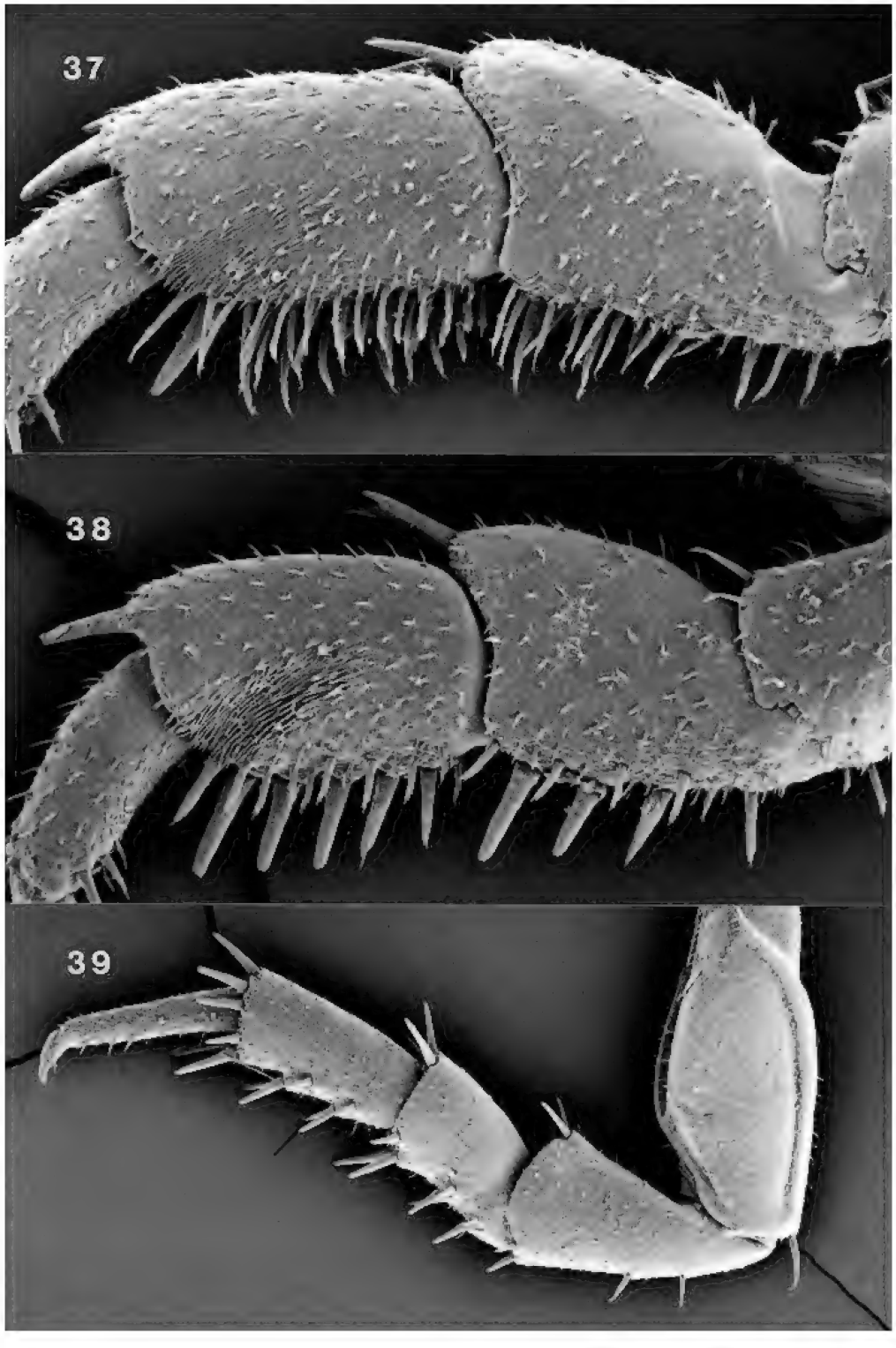
Figs. 30–32. *Leptotrichus naupliensis*, ♂, 10 mm long, island Kásos (SMNS 1972), SEM, air-dried, head and pereion-tergite I in dorsal view of head and enlarged details.



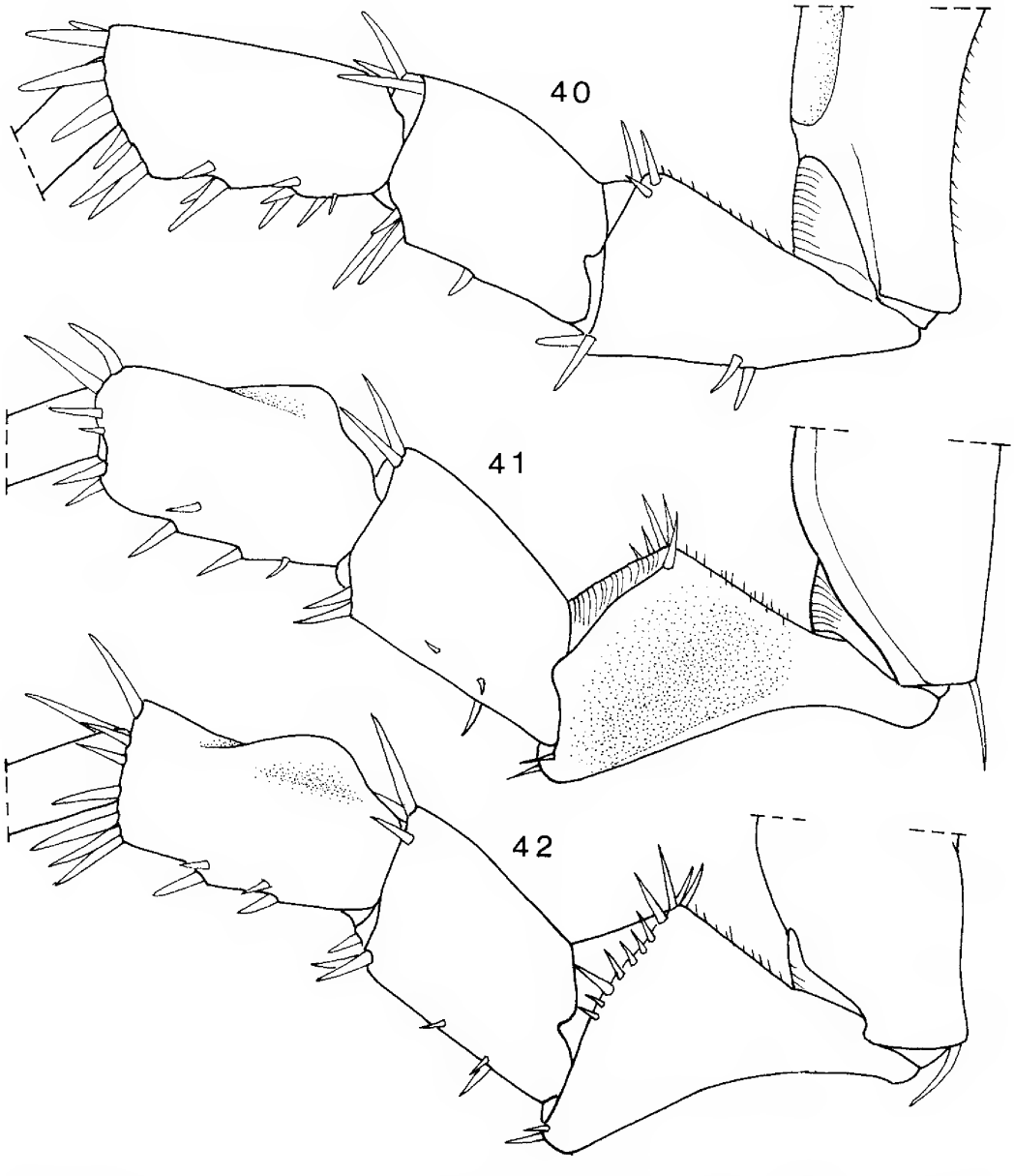
Figs. 33–34. *Leptotrichus naupliensis*, ♂, 8 mm long, island Íos (SMNS 2299), SEM, critical point preparation, margin of pereion-tergite I in dorsal view and enlarged detail.



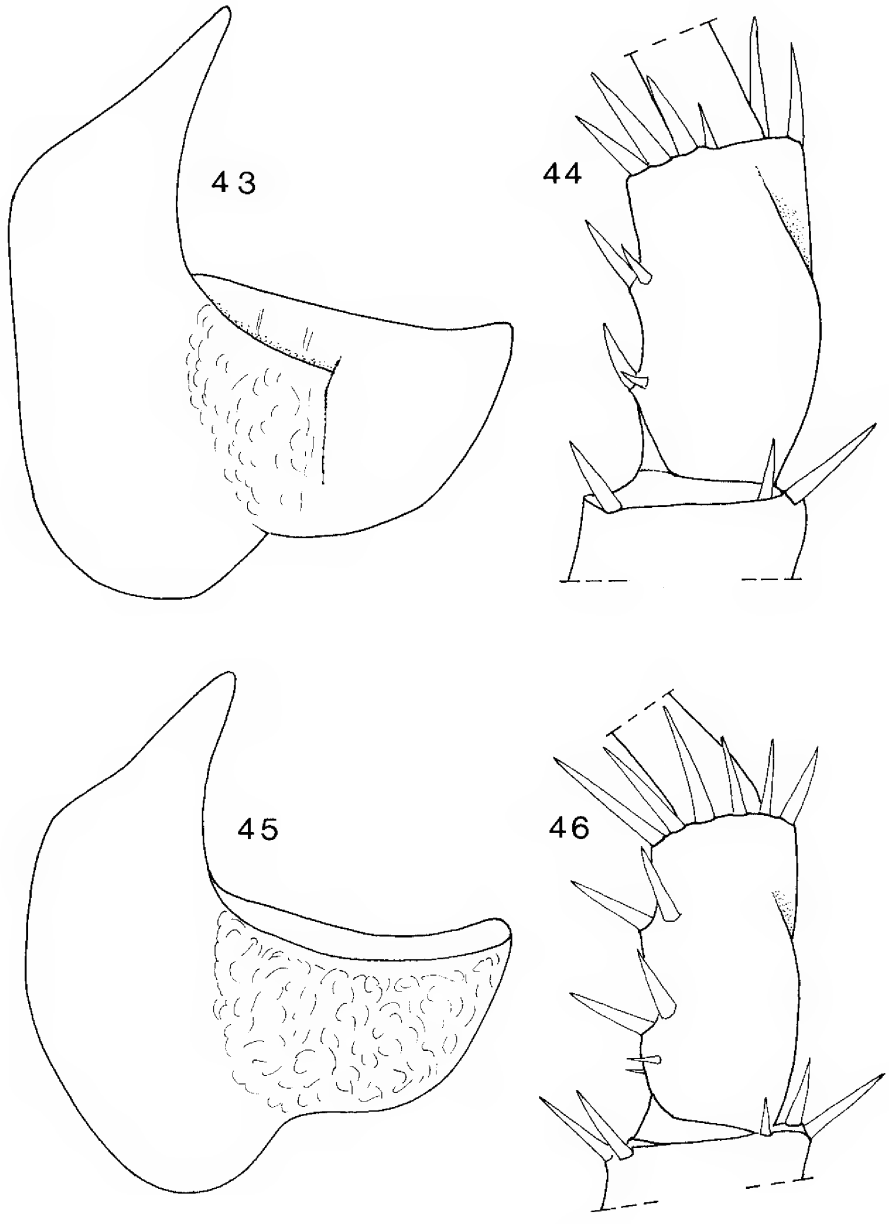
Figs. 35–36. *Leptotrichus naupliensis,* ♀, 10 mm long, island Íos (SMNS 2299), SEM, air-dried after ultrasound treatment, left (fig. 36) and right (fig. 35) mandible.



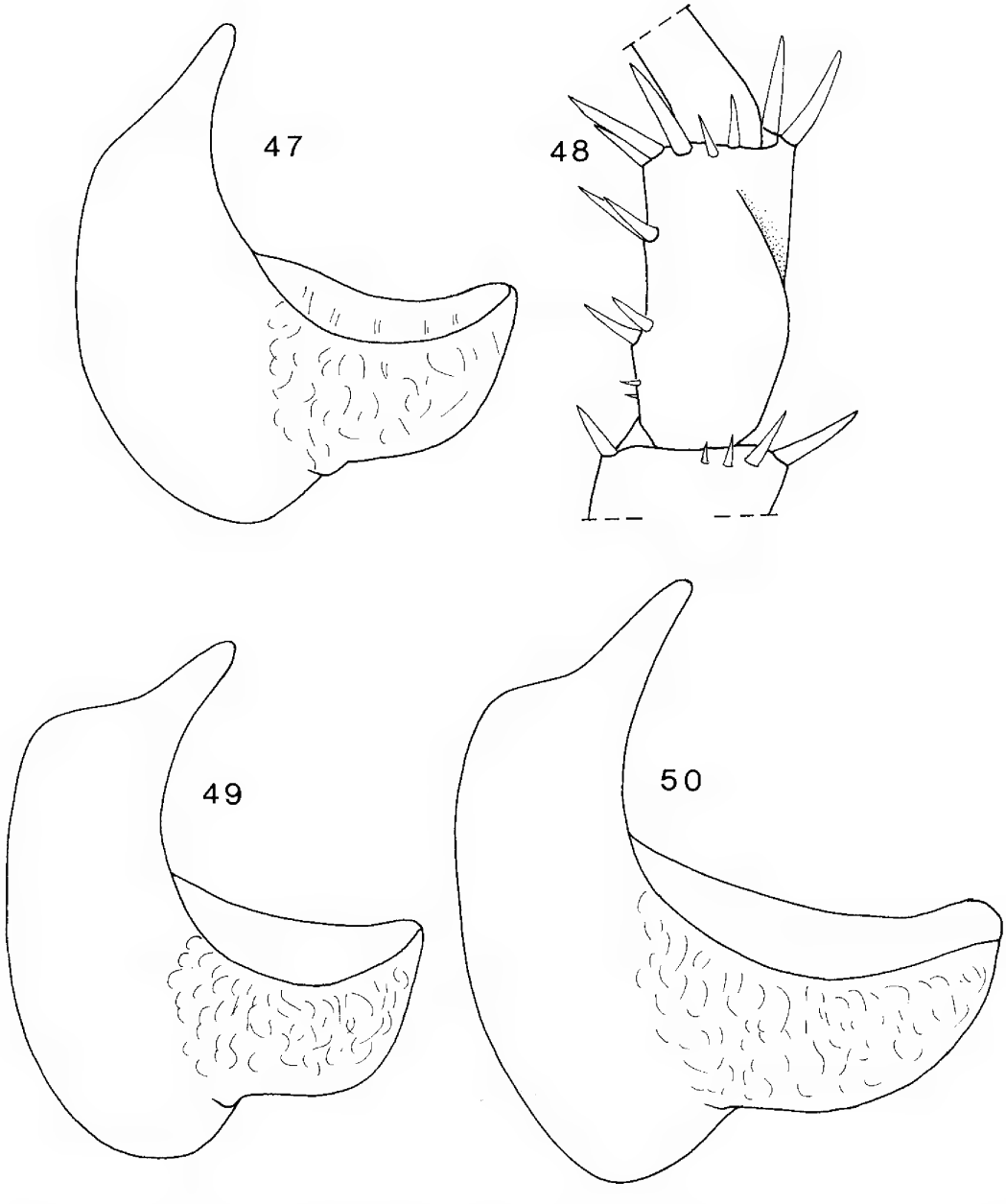
Figs. 37–39. *Leptotrichus naupliensis,* island Santorini (SMNS 2074), SEM, air-dried. – 37. ♂, 10 mm long, pereiopod I, frontal side; – 38. ♀, 8.5 mm long, pereiopod I, frontal side; – 39. same specimen as before, pereiopod VII.



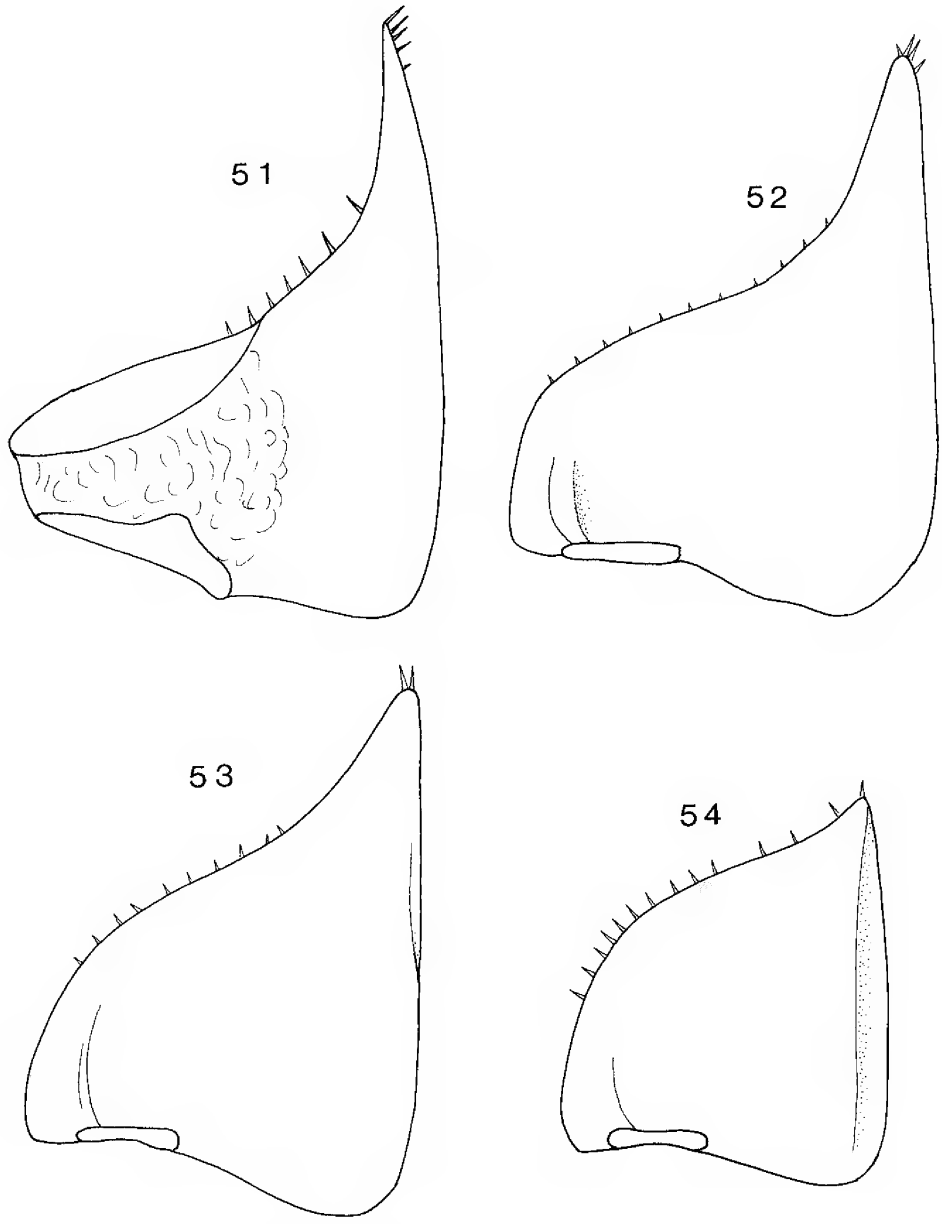
Figs. 40–42. *Leptotrichus naupliensis*, ♂, 10 mm long, island Santoríni (SMNS 2074). – 40. Right pereiopod VI, frontal side; – 41. right pereiopod VII, frontal side; – 42. left pereiopod VII, caudal side.



Figs. 43–46. *Leptotrichus naupliensis.* – 43. Lectotype, ♂, 8 mm long, Navplio (Peloponnese, SMNS T54), pleopod-exopodite I; – 44. as before, carpus VII, caudal side; – 45. syntype of L. *"politus"*, ♂, 3 mm wide, Iraq, Amara (NHML), pleopod-exopodite I; – 46. as before, carpus VII, caudal side.



Figs. 47–50. *Leptotrichus naupliensis*, variability of pleopod-exopodite I, all specimens with ridge on carpus VII. – 47. ♂, 7 mm long, Israel, SW Haifa (SMNS 11315), pleopod-exopodite I; – 48. as before, carpus VII; – 49. ♂, 7.5 mm long, Israel, Gilboa Mts. (SMNS 11318), pleopod-exopodite I; – 50. ♂, 10 mm long, Greece, island Santoríni (SMNS 2074), pleopod-exopodite I.



Figs. 51–54. As fig. 50, pleopod-exopodites II–V, dorsal views.

3.3. *Leptotrichus panzerii* (Audouin, 1826) (figs. 56–67 and map fig. 55)

Material examined

Greece: 1 ♂, Ionian island Kefaloniá, Ássos, leg. HAUSER 8. IV. 1970 (SMNS 2117). – 2 sp., island Kefaloniá, Kaligáta 10 km SSW Argostóli, sandy beach, leg. SCHMALFUSS 2. V. 1996 (SMNS 2546). – 28 sp., island Kefaloniá, 1 km W Fiskárdho, maquis, 100 m, leg. SCHMALFUSS 4. V. 1996 (SMNS 2551). – 3 sp., island Kefaloniá, 9 km N Lixúri, beach, leg. SCHMALFUSS 6. V. 1996 (SMNS 2555). – 1 ♀, Ionian Sea, Strofádhes Islands 60 km S Zákinthos, island Stamfáni, leg. PIEPER 14. IX. 1980 (SMNS 1343). – 8 sp., SW-Peloponnese, Glifadháki near Pilos, leg. KÜHNELT 11. IV. 1970 (SMNS 1836, SCHMALFUSS 1979). – 2 sp., S-Peloponnese, Yithio, beach, leg. KÜHNELT 3. VI. 1961 (SMNS 1862, SCHMALFUSS 1979). – 9 sp., S-Aegaean, island Santoríni, sandy seashore, leg. BAEHR, HOFFMANN, SCHLEGEL 28.–31. III. 1978 (SMNS 1947, SCHMALFUSS & SCHAWALLER 1984).

Italy: 1 ♀, prov. Abruzzo, Marino di Vasto, beach, leg. SCHAWALLER VI. 1987 (SMNS 7262). – 1 ♀, Campania, NW Paestum, beach, leg. GRIMM & RACHINSKY 14. IV. 1984 (SMNS 7220). – 1 ♂, Sicily, Ragusa, 2 km W Sampieri, leg. GRIMM & RACHINSKY 20. IV. 1984 (SMNS 7217). – 1 ♂, Sicily, Siracusa, Pantano Grande N Pachino, leg. GRIMM & RACHINSKY 19. IV. 1984 (SMNS 7218). – 2 sp., Sardinia, prov. Oristano, Putzu Idu, beach, leg. BRETZENDORFER 2. VI. 1987 (SMNS 7266). – 9 sp., Sardinia, prov. Oristano, Sinis, leg. SCHAWALLER 14. IV. 1992 (SMNS 7374, 7375, 7376). – 1 ♀, Sardinia, prov. Cagliari, N San Vito, 50 m, leg. SCHEUERN 18. IV. 1992 (SMNS 7386).

Malta: 1 sp., south coast, Dingli Cliffs, leg. FIECHTNER & LEIDENROTH I. 1991 (SMNS 7325). – 4 sp., island Gozo, Dwejra, leg. BARNEKOW & NOETHLICHS 10. V. 1988 (SMNS 7304). – 1 sp., island Gozo, leg. BARNEKOW-NOETHLICHS 25. V. 1996 (SMNS 7435).

Spain: 1 sp., Balearic Islands, Mallorca, Cala Millor, leg. BAEHR 2. III. 1983 (SMNS 9182). – 2 sp., Costa Brava, Ampurias, leg. HOFFMANN 11. VII. 1977 (SMNS 9063). – 1 sp., prov. Gerona, La Escala, leg. BAEHR & HOFFMANN IV. 1981 (SMNS 9130). – 7 sp., prov. Alicante, 1 km W Moncayo, leg. BAEHR & HOFFMANN 16. IV. 1981 (SMNS 9086). – 2 sp., prov. Alicante, Santa Pola, leg. BAEHR & HOFFMANN 19. IV. 1981 (SMNS 9121). – 6 sp., prov. Almeria, Cabo de Gata, leg. BAEHR & HOFFMANN 17. IV. 1981 (SMNS 9079, 9122). – 6 sp., prov. Almeria, 22 km N Nijar, leg. BAEHR & HOFFMANN 17. IV. 1981 (SMNS 9120). – 11 sp., prov. Malaga, Nerja, maquis, leg. SCHEUERN IV. 1987 (SMNS 9280).

Madeira: 6 sp., island Porto Santo, Ponta, leg. GRIMM & RACHINSKY 18. XII. 1986 (SMNS 15365).

Canary Islands: 1 ♂, island Gran Canaria, Castillo del Romeral, beach, leg. BARNEKOW-NOETHLICHS 5. I. 2000 (SMNS 15534).

Cape Verde Islands: 1 ♂, island Sâo Tiago, Tarrafal, beach, leg. LOBIN 18. X. 1979 (SMNS 15052, SCHMALFUSS 1982).

Tunisia: 1 ♂, Cap Bon, Menzel Temime, leg. SCHMALFUSS 4. IV. 1974 (SMNS 15017).

Egypt: 5 sp., Alexandria, Botanical Garden, leg. TANTAWI 1989 (SMNS 15403).

Further records

Greece: Further safe records from Greece are from the Ionian island Levkádha (STROUHAL 1936 a) and Kálamos (STROUHAL 1942).

For further records in other regions see bibliography in chapter 2.

Distribution see chapter 2. and map fig. 55

Diagnostic characters

Maximum dimensions: VANDEL (1962: 645) states 10×4 mm for females.

Coloration: Yellowish with variable brownish pigmentation, caudal half darker, rows of light spots at the bases of the epimera.

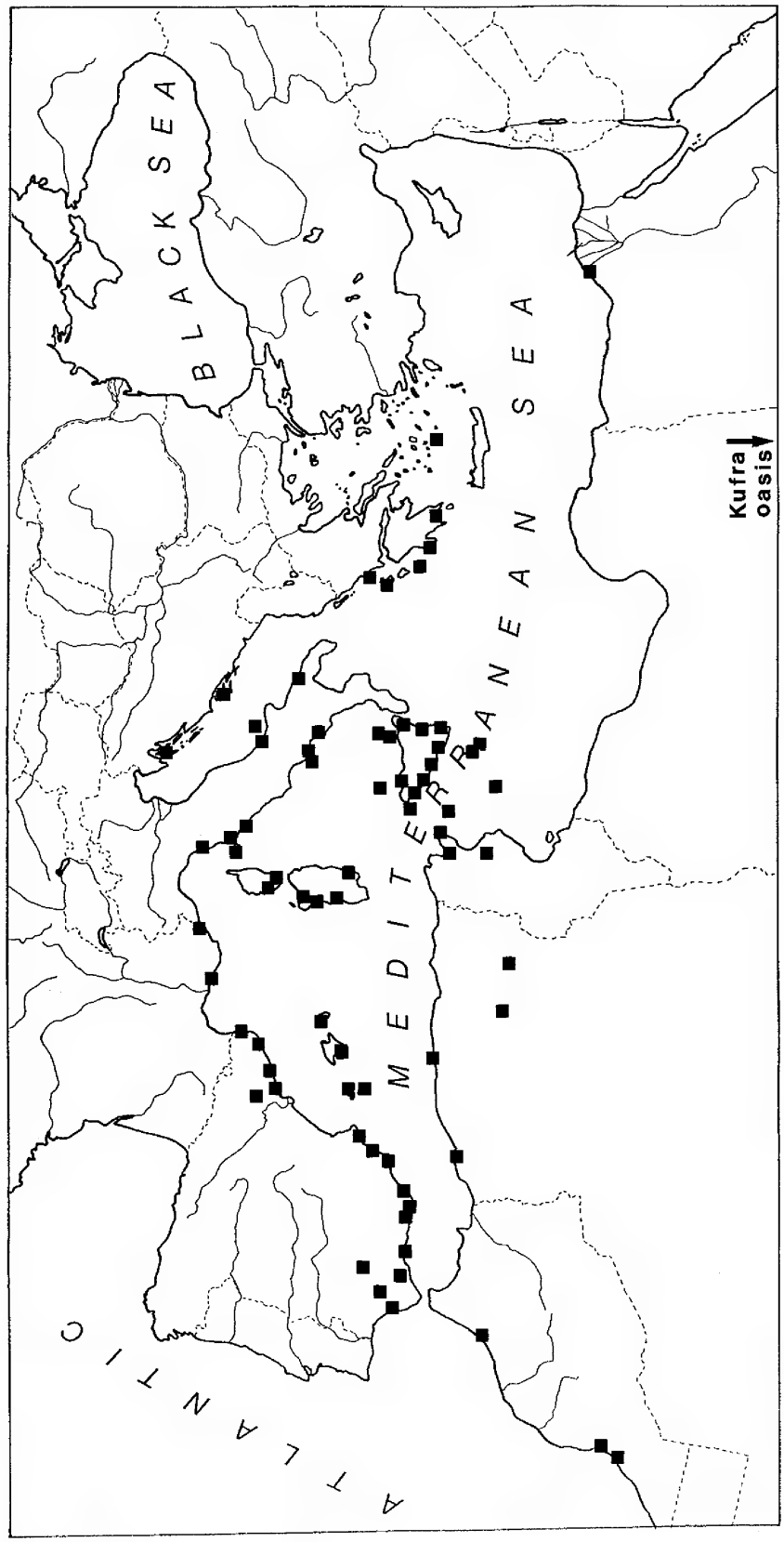
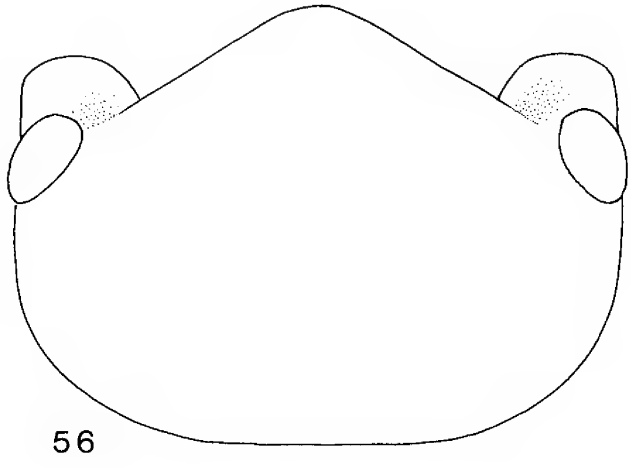


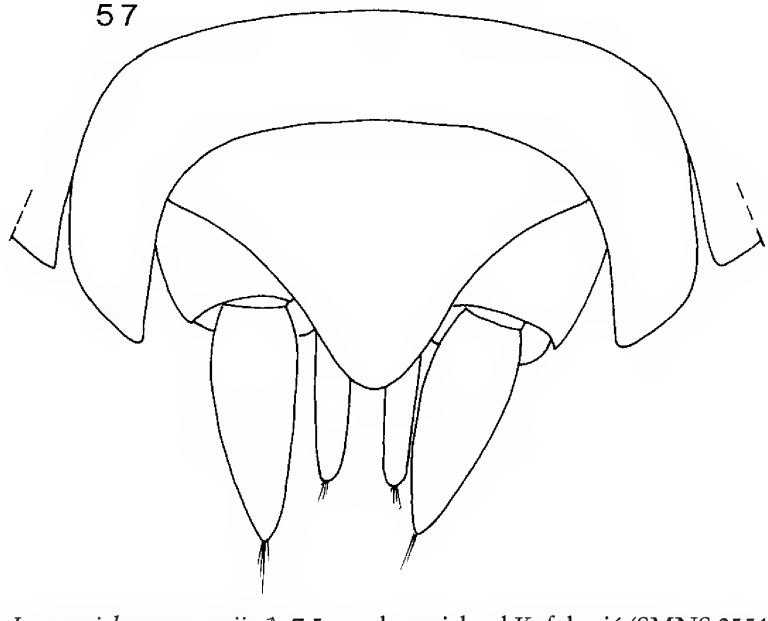
Fig. 55 Recorded distribution of *Leptotrichus panzerii*. In addition to the indicated records the species is known from the Azores, Madeira, Canary Islands, Cape Verde Islands, Bermuda and (introduced) St. Helena Island (southern Atlantic).

Cuticular structures: Tergal parts with upright hair-like setae slightly directed backwards; a row of very long upright setae along the epimeral margins (figs. 58–59).

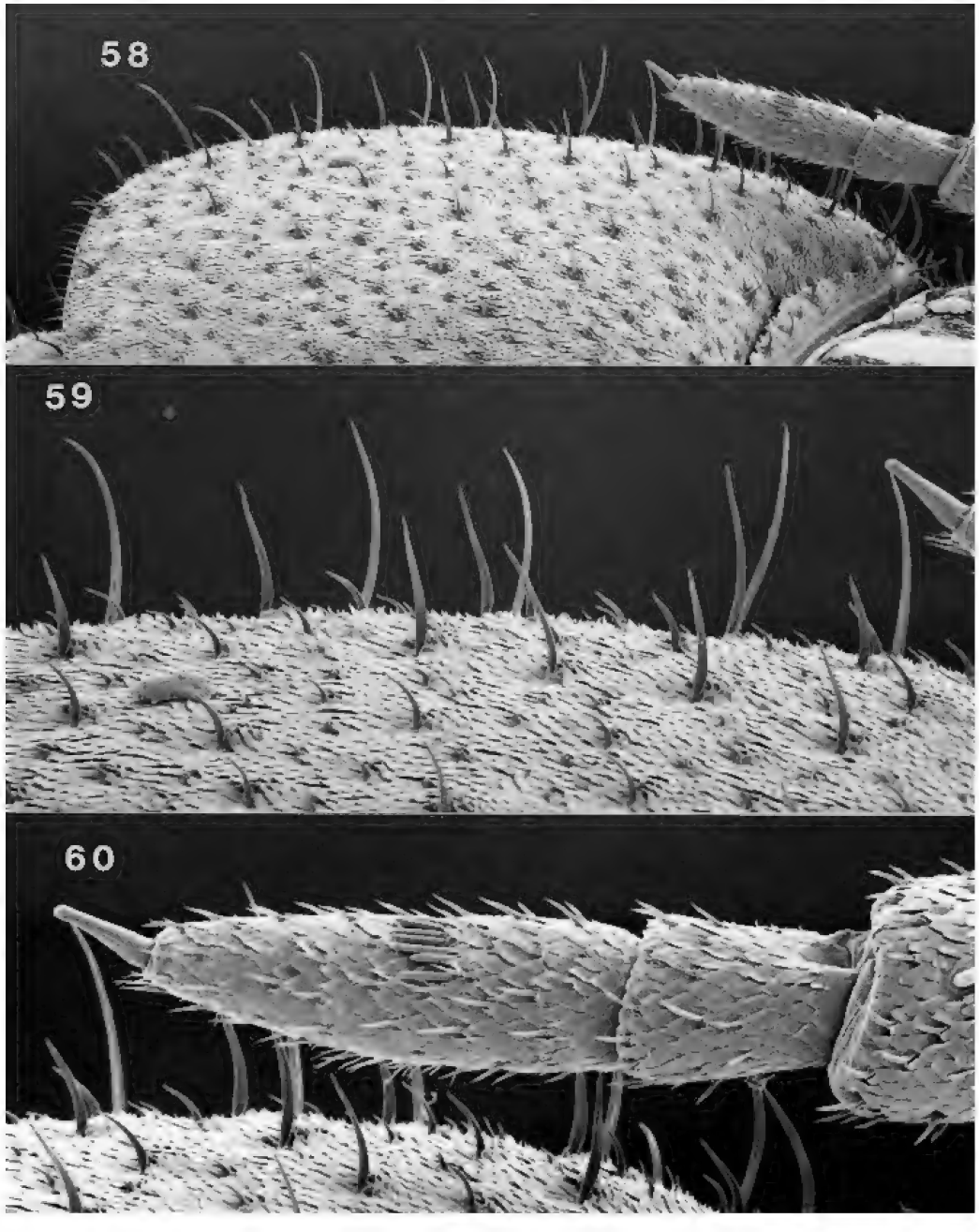
Head with angular median process surpassing side-lobes (fig. 56). Hind margin of pereion-epimeron I straight. Inner sides of pleopod-epimera V diverging (fig. 57). Telson shorter than in other species, width/length ratio 8/5 (fig. 57).

Antenna II with distal joint of flagellum twice as long as proximal one (fig. 60), aesthetascs see fig. 61. Male pereiopods I–IV with spinal brushes on merus and carpus, rudimentary on pereiopod IV. Female pereiopod I without brushes, see figs. 62–63. Male pereiopod VII without any trace of ridge on carpus, ischium proximally strongly concave (figs. 64–65). Male pleopod-exopodite I with triangular, acutely pointed hind-lobe (fig. 66), exopodite II with very long and very acutely pointed hind-lobe (fig. 67). Uropods see fig. 57.

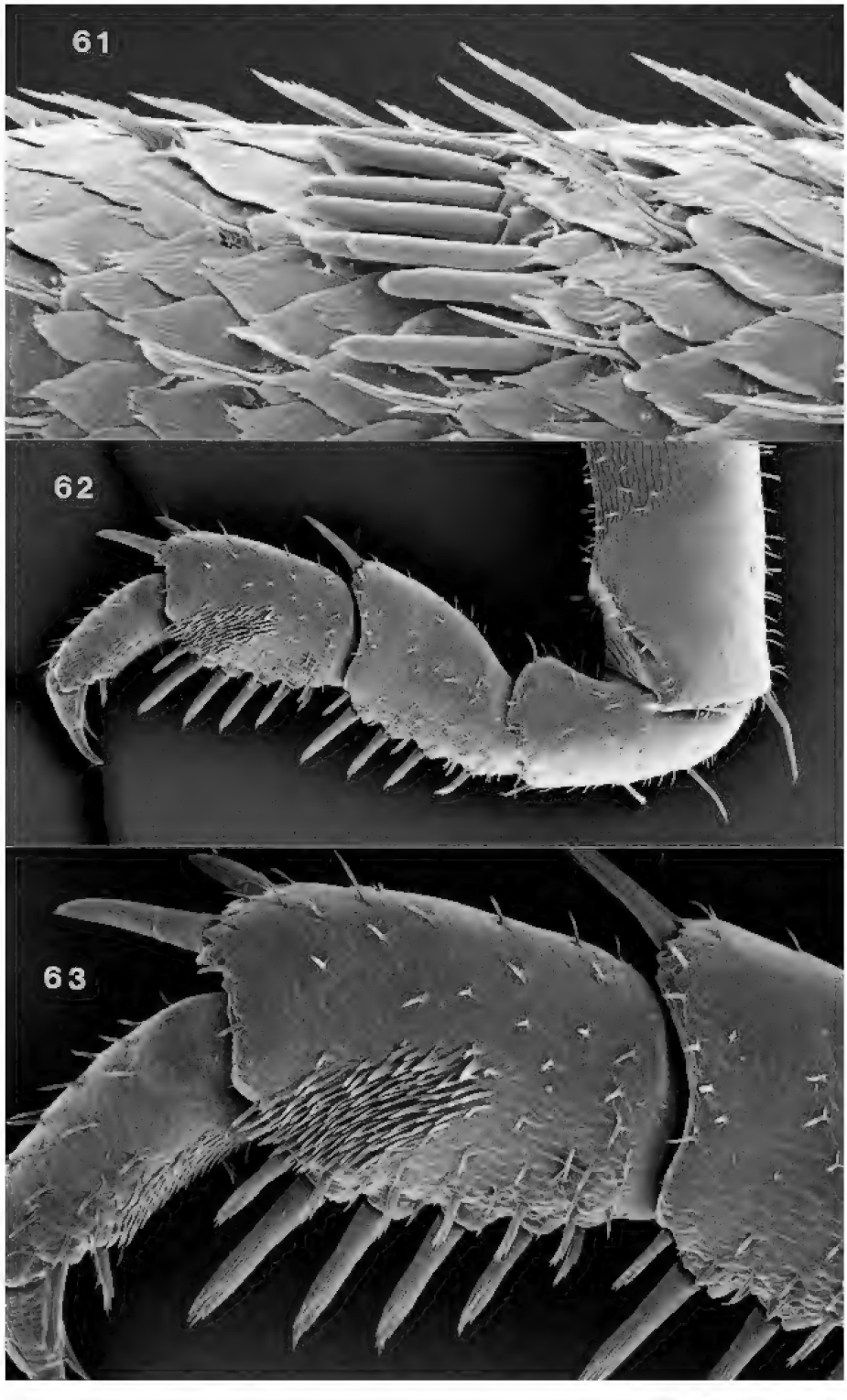




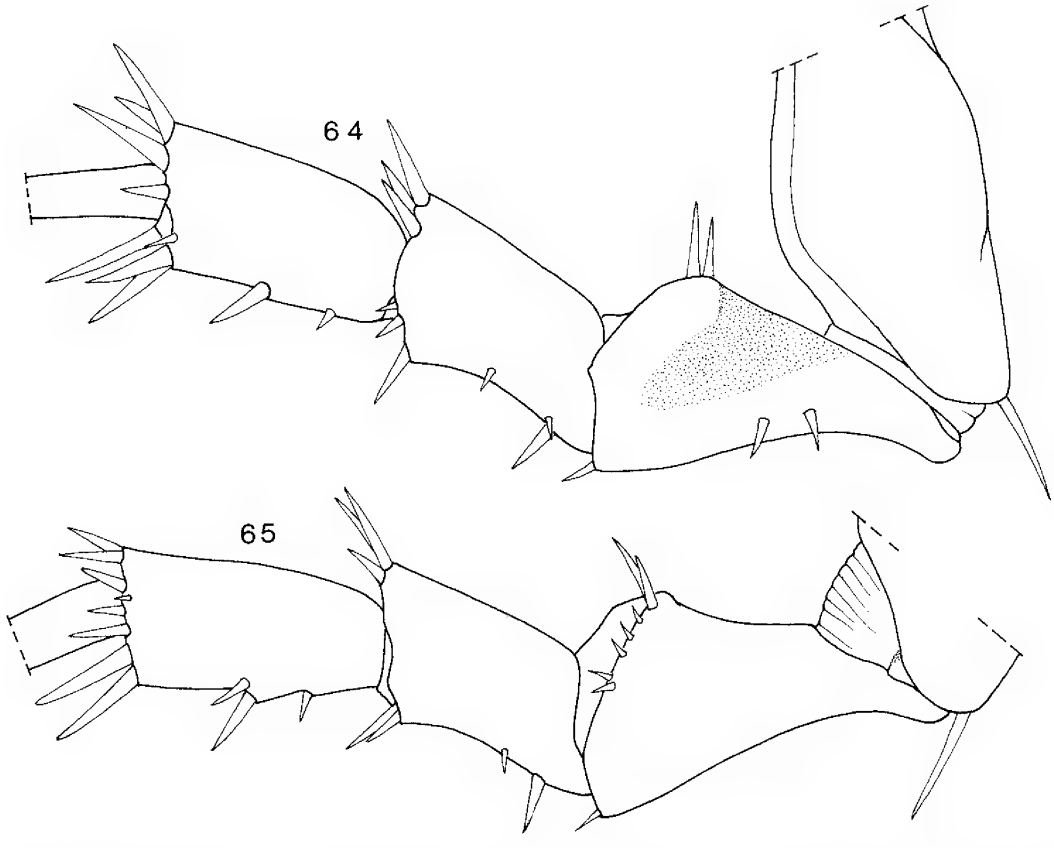
Figs. 56–57. *Leptotrichus panzerii*, ♂, 7.5 mm long, island Kefaloniá (SMNS 2551). – 56. Head in dorsal view; – 57. pleon-tergite V, telson and uropods in situ.



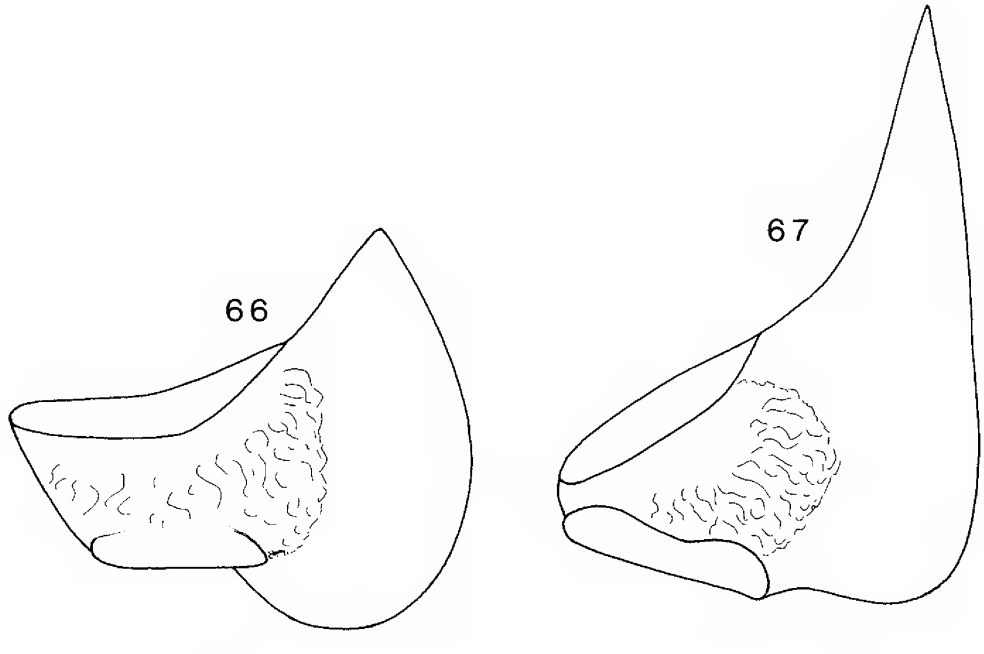
Figs. 58–60. *Leptotrichus panzerii*, ♂, 7 mm long, island Kefaloniá (SMNS 2555), SEM, critical point preparation, margin of pereion-tergite I in dorsal view and enlarged details.



Figs. 61–63. *Leptotrichus panzerii.* – 61. As before, detail of antennal flagellum with aesthetascs; – 62. ♀, 6.5 mm long, island Kefaloniá (SMNS 2551), SEM, air-dried, pereiopod I, frontal view; – 63. as before, carpus I enlarged.



Figs. 64–65. *Leptotrichus panzerii,* ♂; 7.5 mm long, island Kefaloniá (SMNS 2551), pereiopod VII, frontal and caudal side.



Figs. 66–67. Same specimen as before, pleopod-exopodites I and II.

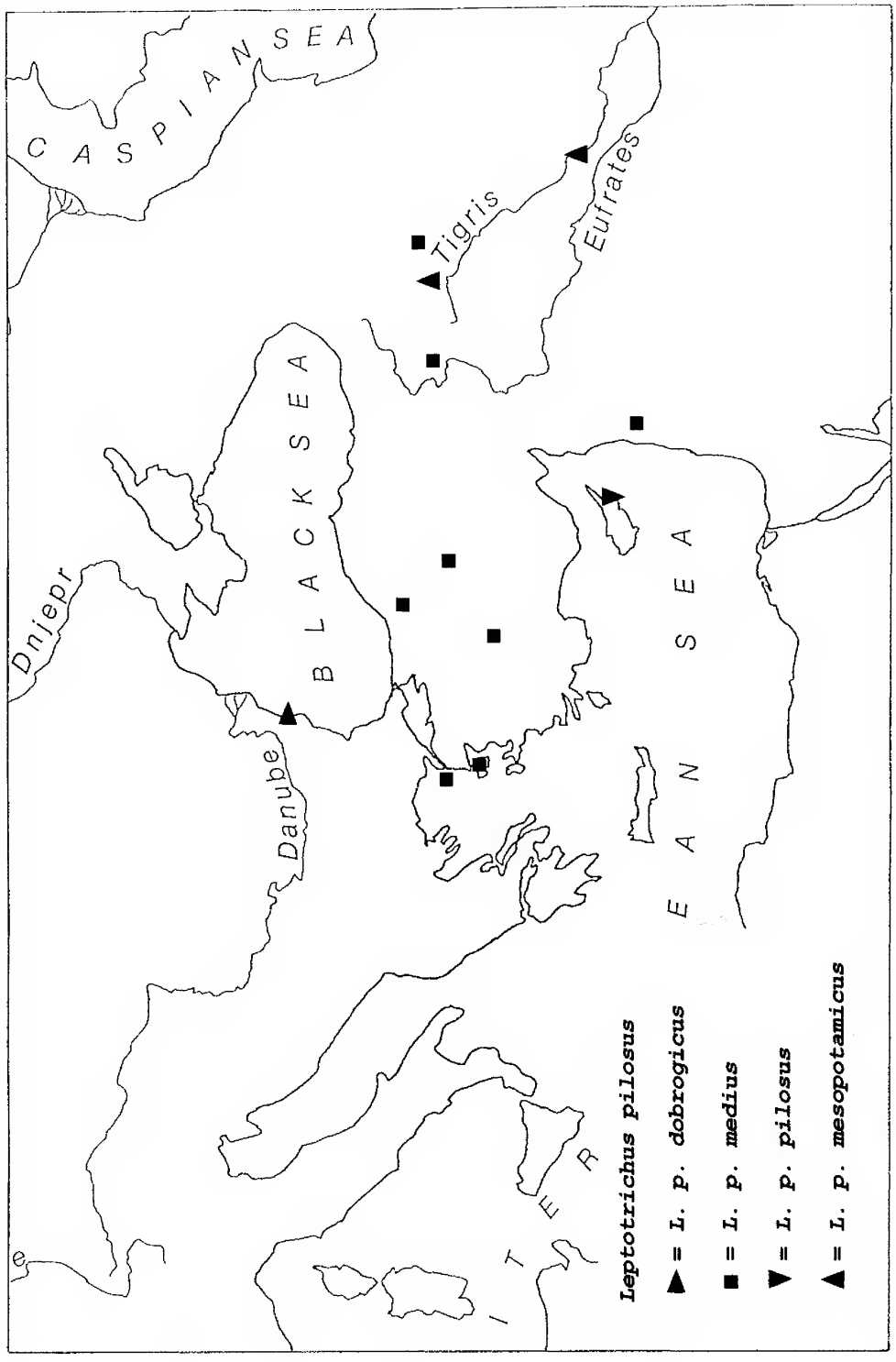


Fig. 68. Recorded distribution of *Leptotrichus pilosus*. Subspecies questionable.

3.4. *Leptotrichus pilosus medius* Verhoeff, 1941 (figs. 70–81 and maps figs. 68–69)

Material examined

Greece: 1 ♂ (8.5 mm), 1 ♀ with marsupium (8.5 mm), NE-Aegean, island Lésvos, north coast, Skála Sikamiás, sand and pebble beach, leg. ERHARD & SCHMALFUSS 18. V. 1995 (SMNS 2508).

Turkey: 1 ♂ (7.5 mm), 3 ♀♀ (max. 9 mm), NE-Aegean, island Gökçe Ada, Kaleköy, leg. LIEBEGOTT 13. V. 1988 (SMNS 11273).

Further records

Turkey: Afyon (western Anatolia, VERHOEFF 1941); – Bolu (NW-Turkey) and Ankara (STROUHAL 1960); – Nazük Gölü NW Lake of Van (E-Turkey, STROUHAL 1960).

Lebanon: Bekaa-Plain (VANDEL 1955).

Distribution see chapter 2 and maps figs. 68–69

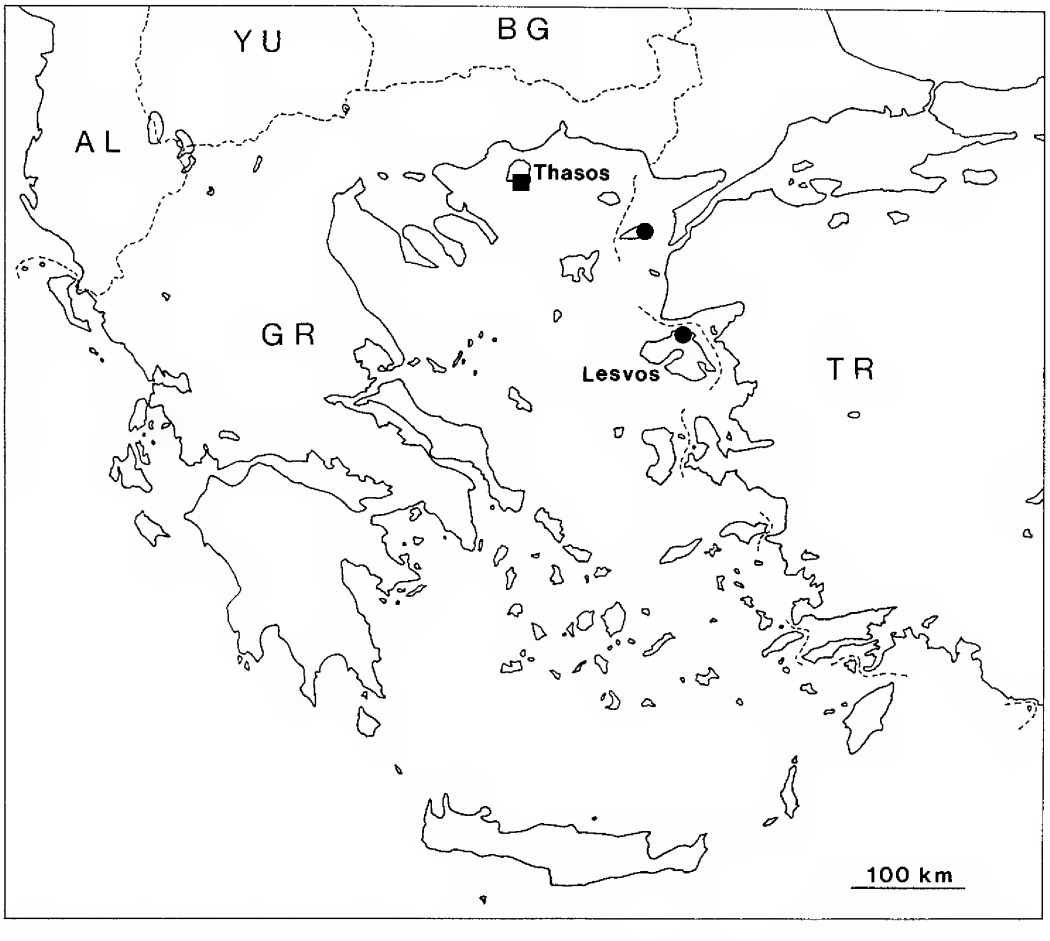
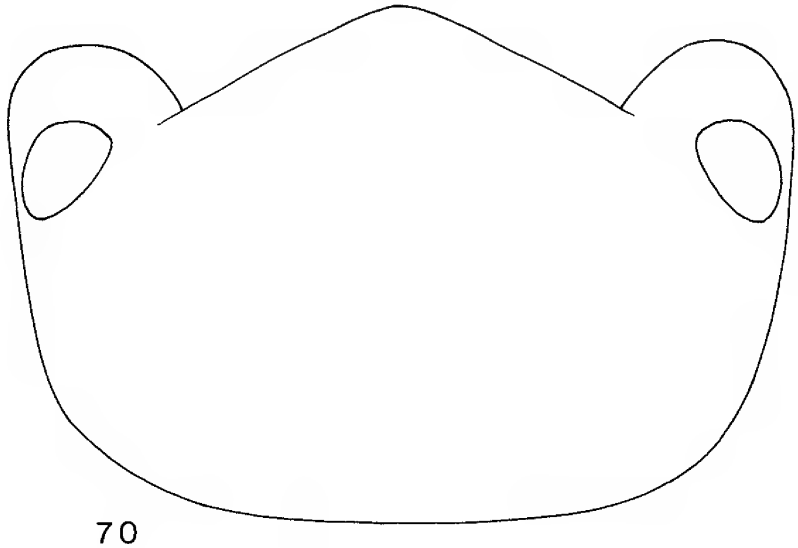
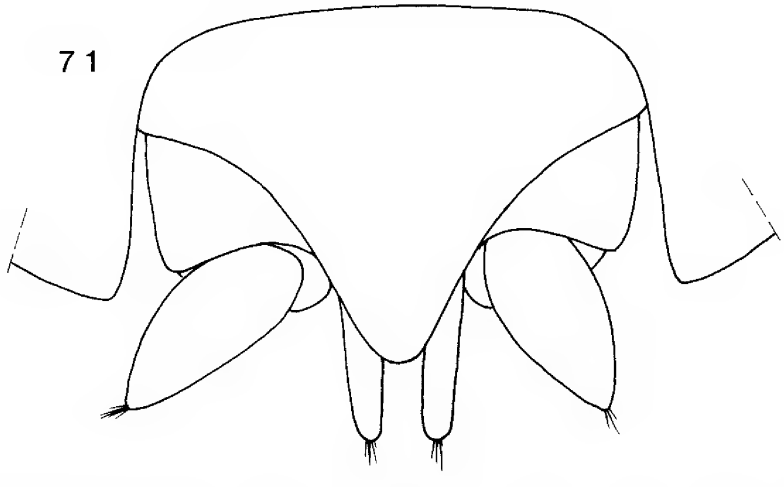


Fig. 69. Aegean records of *Leptotrichus pilosus medius* (●) and type locality of *Leptotrichus spinosus* n.sp. (■).





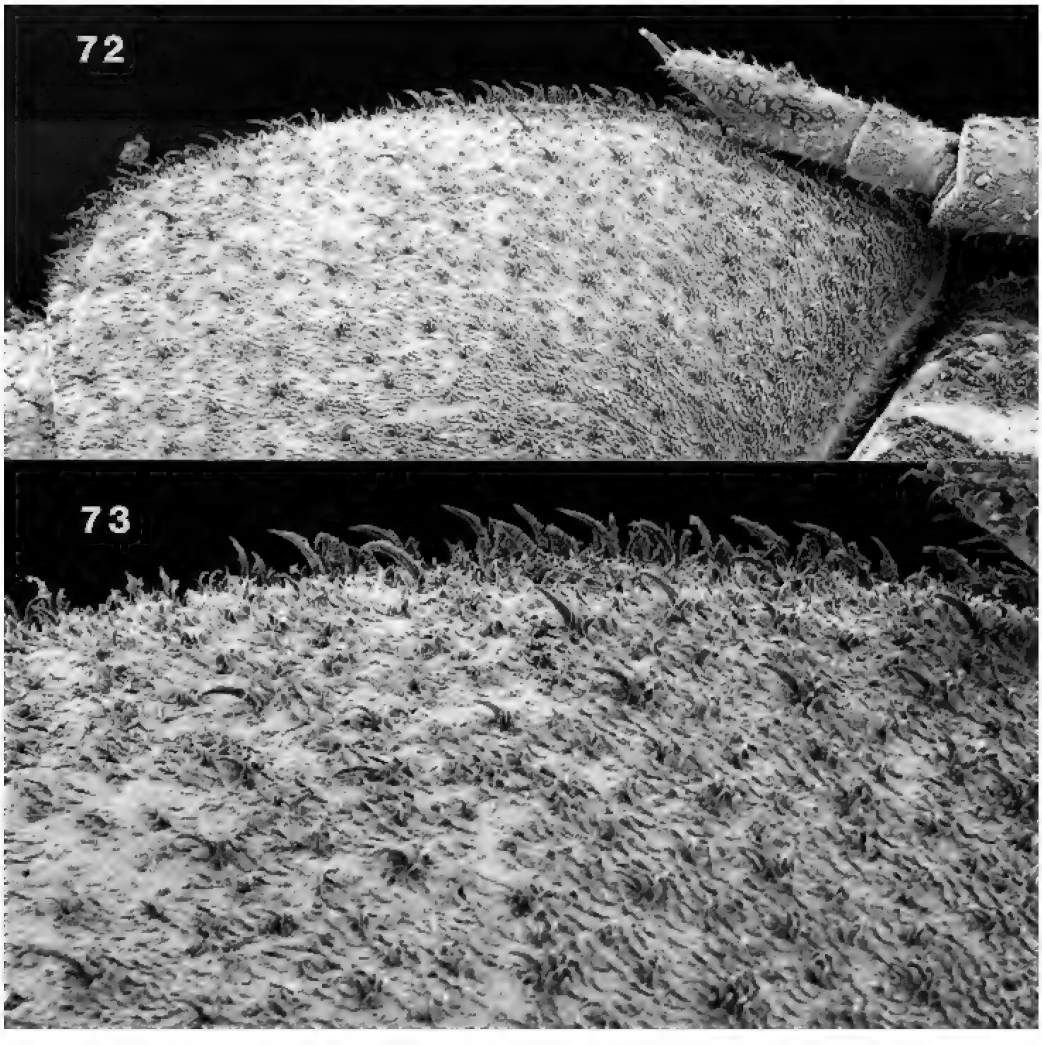
Figs. 70–71. *Leptotrichus pilosus medius*, ♂, 7.5 mm long, Turkish island Gökçe Ada (SMNS 11273). – 70. Head in dorsal view; – 71. telson and uropods in situ.

Diagnostic characters

Maximum dimensions: Strouhal (1960: 107) reports a male from Ankara with a length of 13.5 mm. In the examined material from the Aegean islands the maximum length is 9.0 mm.

Coloration: The specimens from the Aegean islands are nearly without pigmentation. According to Strouhal (1960: 106) the animals from the Turkish mainland have a light greyish coloration mottled with yellowish.

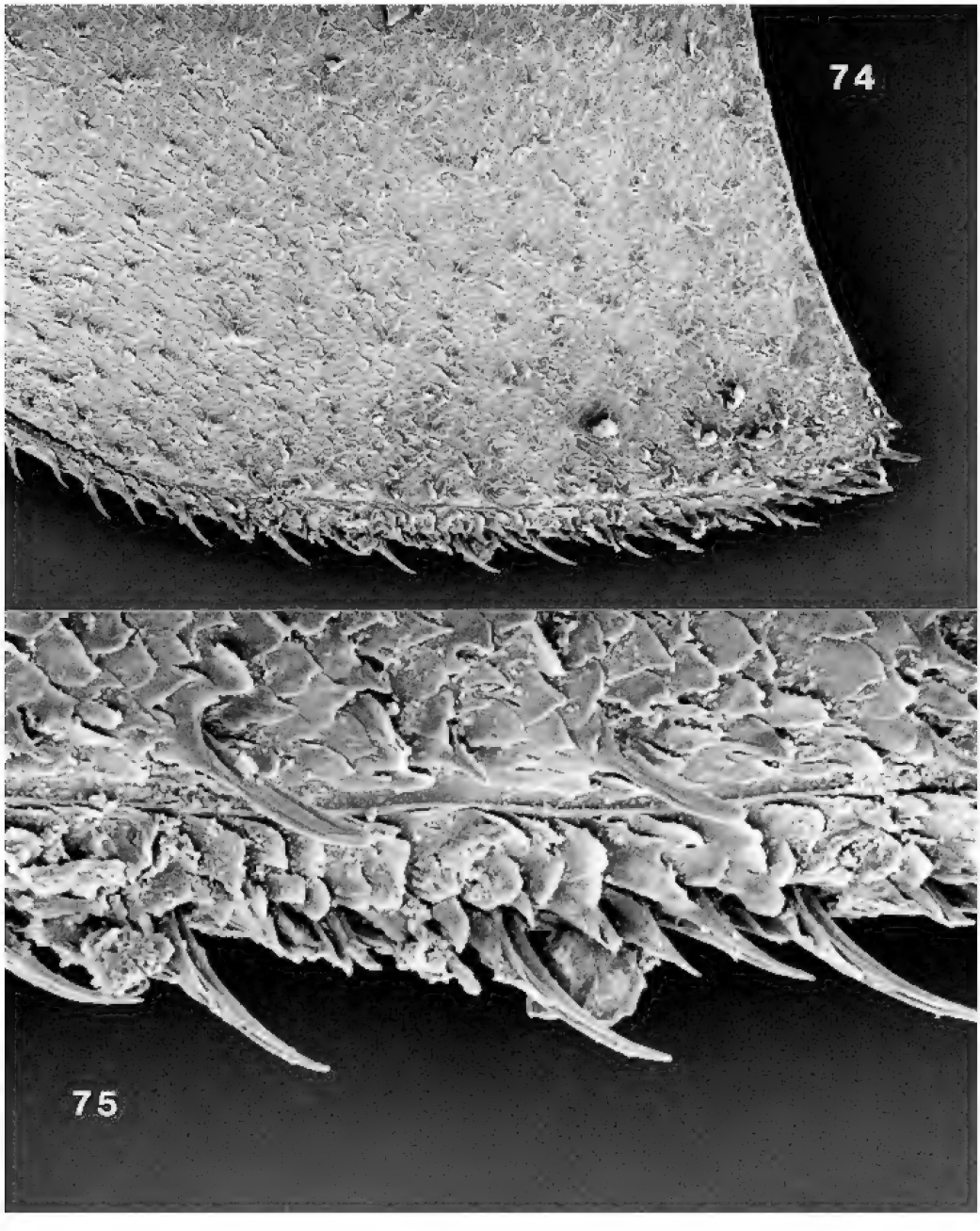
Cuticular structures: Tergites covered with spiny setae which are longer than those in *L. kosswigi* and *L. naupliensis* and bent backwards, also those on the margins (figs. 72–75).



Figs. 72–73. *Leptotrichus pilosus medius*, ♂, 8.5 mm long, island Lésvos (SMNS 2508) SEM, critical point preparation, margin of pereion-tergite I in dorsal view and enlarged detail.

Head with a pointed median process which is only very lightly surpassing the side-lobes (fig. 70). Hind margin of pereion-epimera I slightly but distinctly concave. Inner margins of pleon-tergite V slightly diverging (fig. 71). Telson with a more pointed apex than e.g. in *L. naupliensis* (fig. 71).

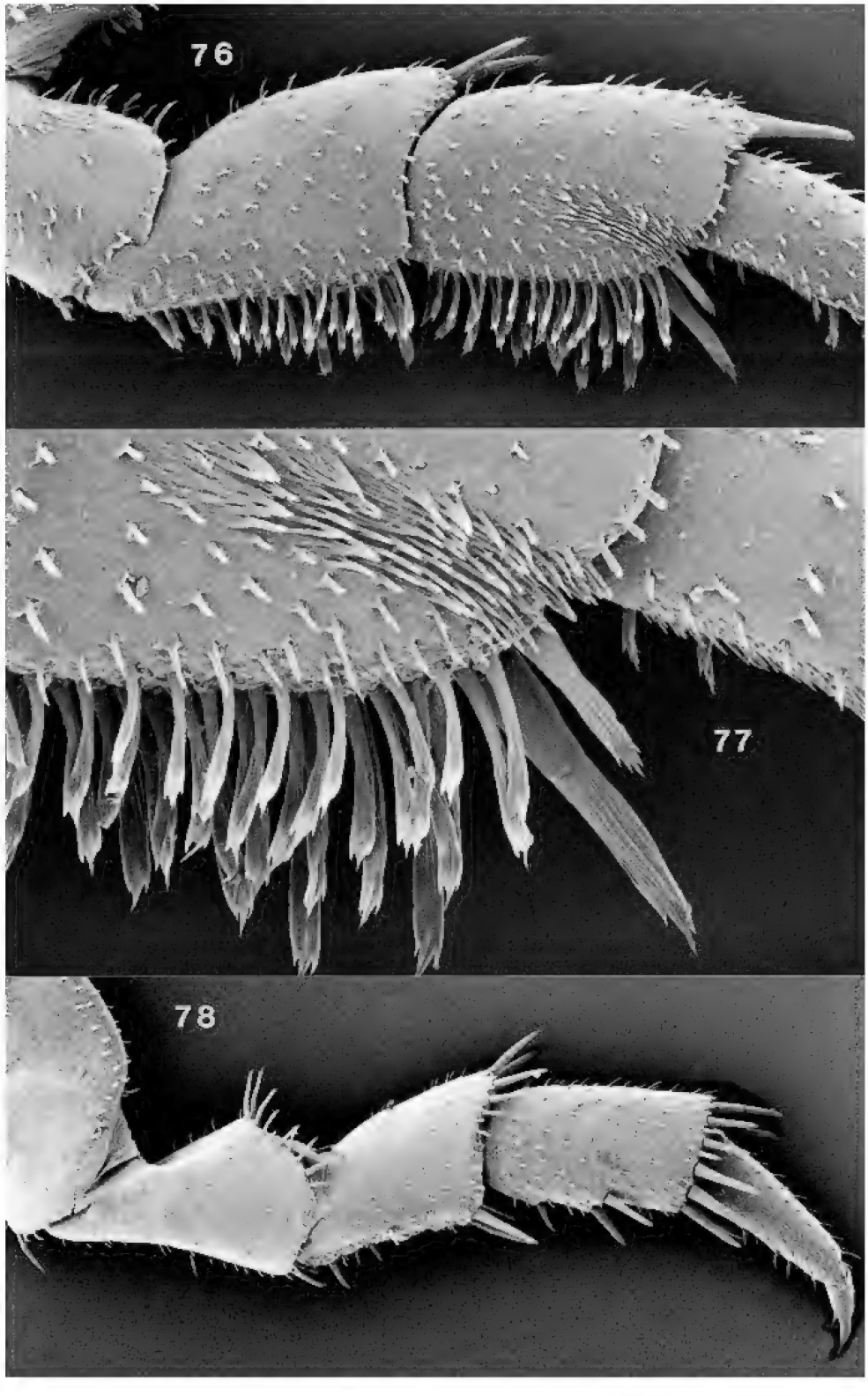
Flagellum of antenna II with distal joint twice as long as proximal one. Male pereiopods I–IV with spine brushes on merus and carpus, pereiopod I see figs. 76–77. Male ischium VII only slightly concave ventrally (fig. 78), carpus VII in the investigated males (7.5 and 8.5 mm long) without any trace of a ridge (figs. 79, 80). Strouhal (1960: 106, fig. 17) figures a trace of a ridge in a male from Ankara with a length of 13.5 mm, so this may be present only in very large males. Male pleopod-exopodite I with long hind lobe whose apex is medially truncated and indented (fig. 81). Uropods see fig. 71.



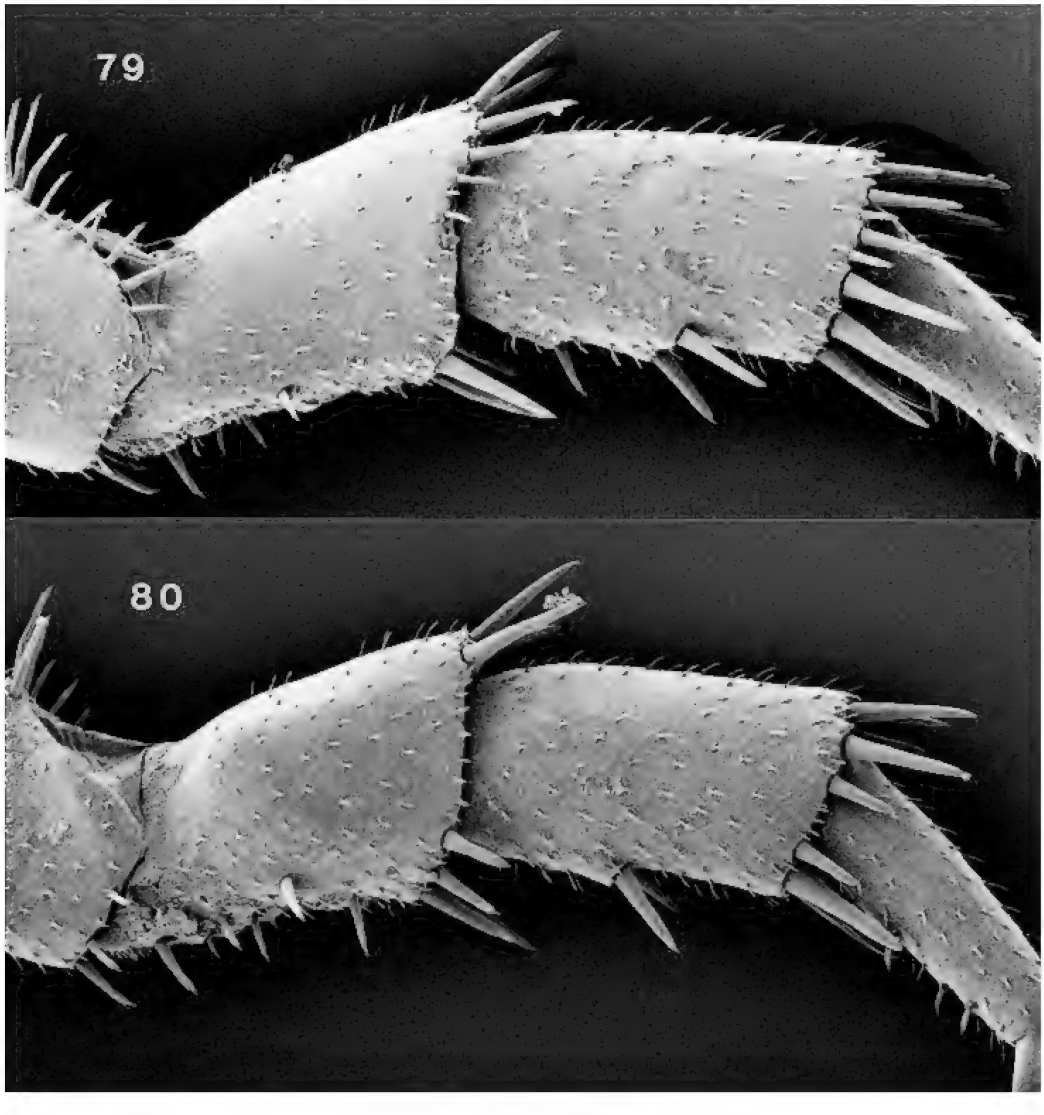
Figs. 74–75. *Leptotrichus pilosus medius*, ♂, 7.5 mm long, island Gökçe Ada (SMNS 11273), SEM, air-dried, epimeron of pereionite VII, dorsolateral view, and enlarged detail.

Remarks

The subspecific subdivision of the species *L. pilosus* seems doubtful, if the distribution of these subspecies are considered (see map. fig. 68). The morphological differences between the subspecies concern mainly the shape of the male pleopod-exopodite I and may be due to individual variability.



Figs. 76–78. Same specimen as before. – 76. Pereiopod I, frontal side; – 77. detail of carpus I with antennal grooming structures; – 78. pereiopod VII.



Figs. 79–80. Same specimen as fig. 74, pereiopod VII, merus and carpus in frontal and caudal view (no ridge on carpus!).

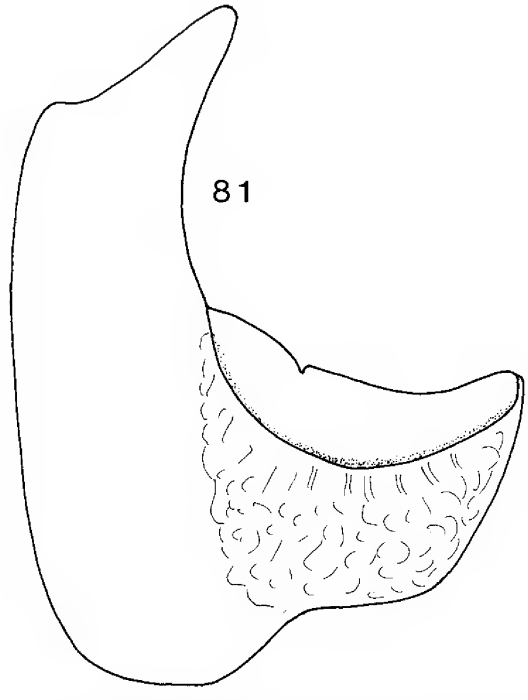


Fig. 81. Same specimen as fig. 74, pleopod-exopodite I.

3.5. *Leptotrichus spinosus* **n.sp.**
(figs. 82–92 and map fig. 69)

Material examined

Holotype: ♂, 5.3×2.8 mm, Greece, north Aegean island Thásos, southeastern part, small sandy beach with freshwater stream, under stone, leg. SCHMALFUSS VI. 1973 (SMNS T403, SCHMALFUSS 1975 as *L. panzeri*).

Paratypes: 4 ♂♂, 4 ♀♀, same locality as holotype, leg. SCHMALFUSS 12. V. 1997 (SMNS T426).

Distribution see chapter 2. and map fig. 69

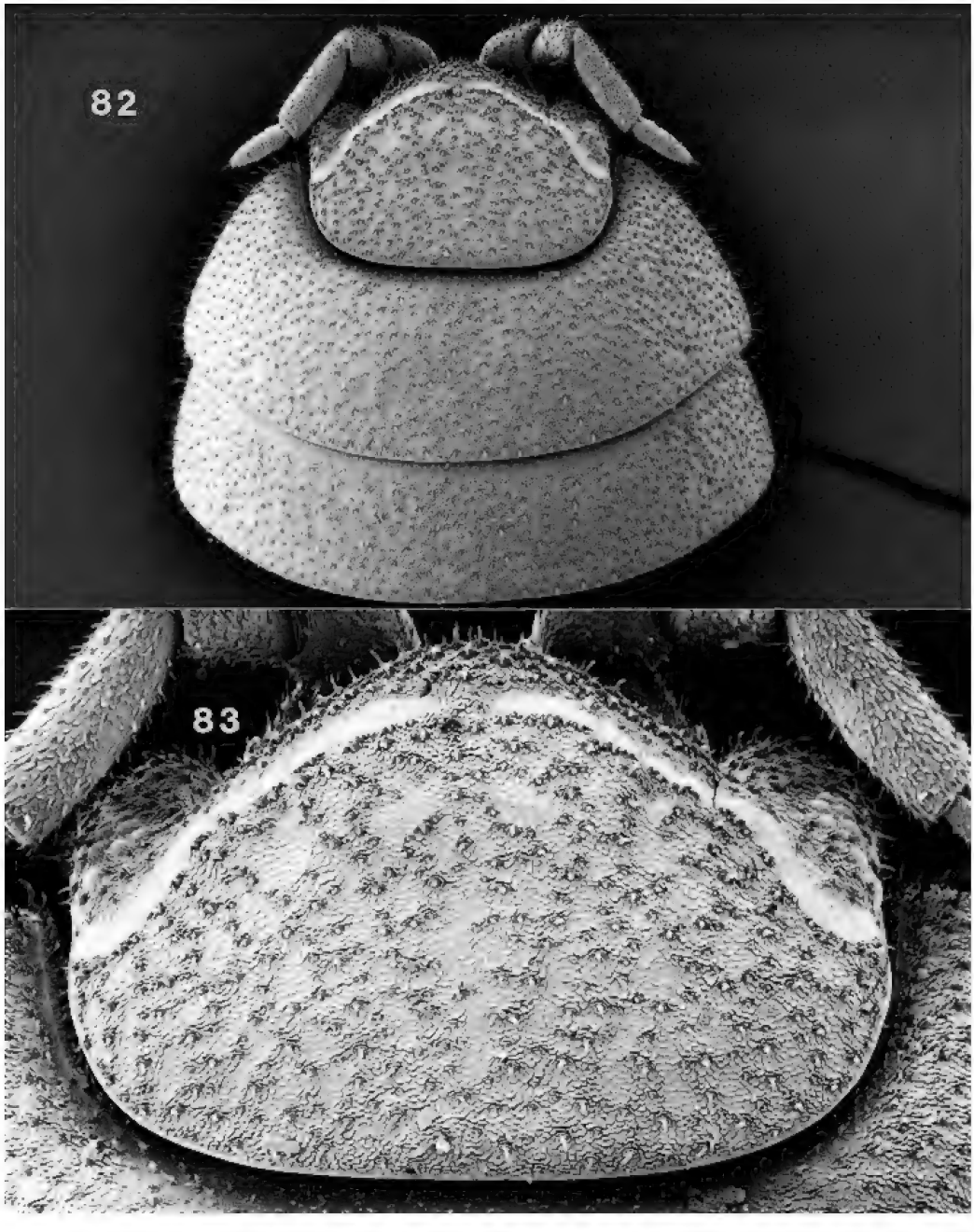
Diagnostic characters

Maximum dimensions: 7.7×3.6 mm.

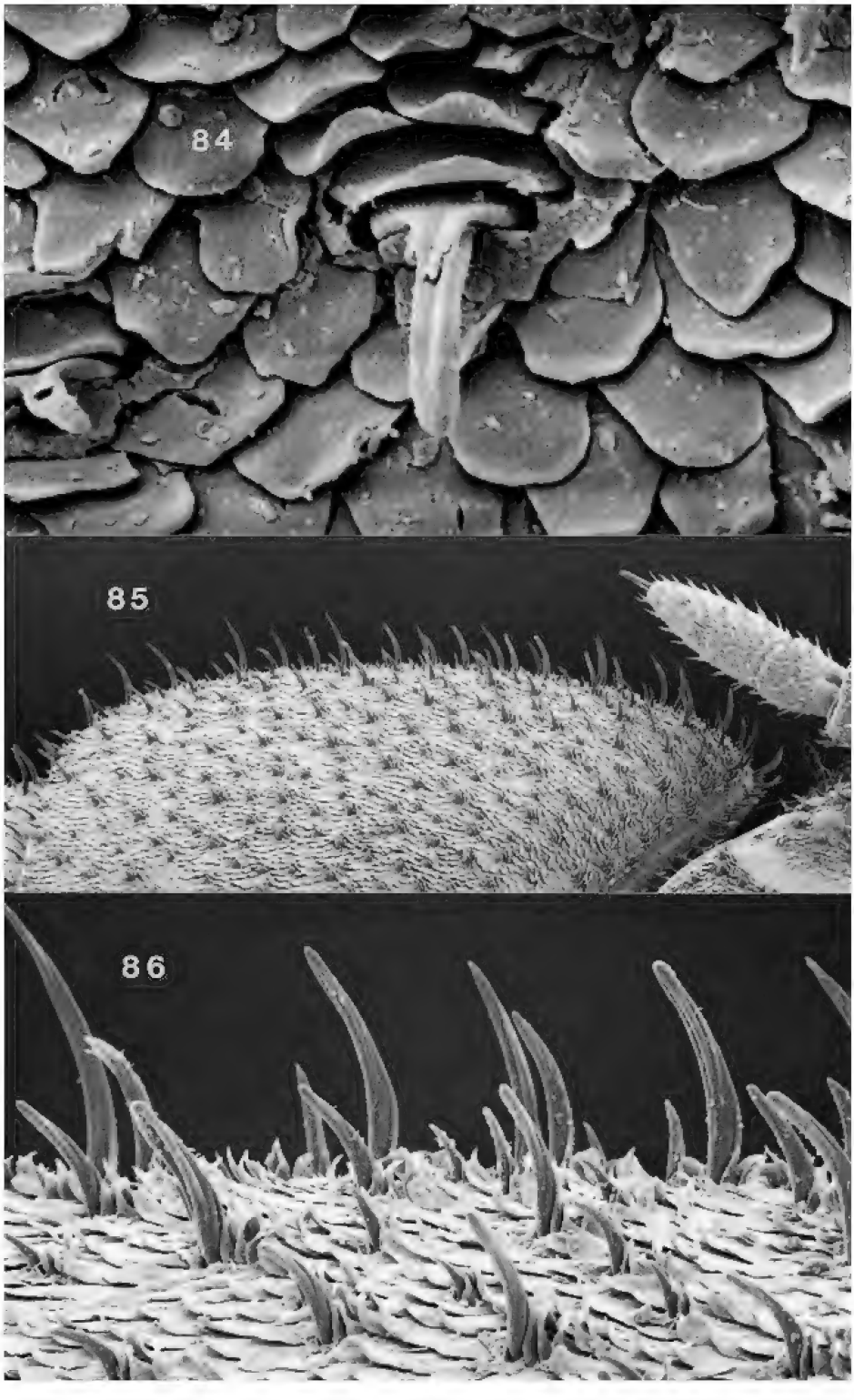
Coloration: Yellowish, tergal parts mottled with light brownish pigmentation.

Cuticular structures: Tergites smooth, covered with spiny straight setae which are longer than in *L. naupliensis* and everywhere directed backwards (figs. 84–86). Along epimeral margins a row of especially long setae which are, in contrast to *L. panzerii* and *L. syrensis*, curved backwards (figs. 85–86).

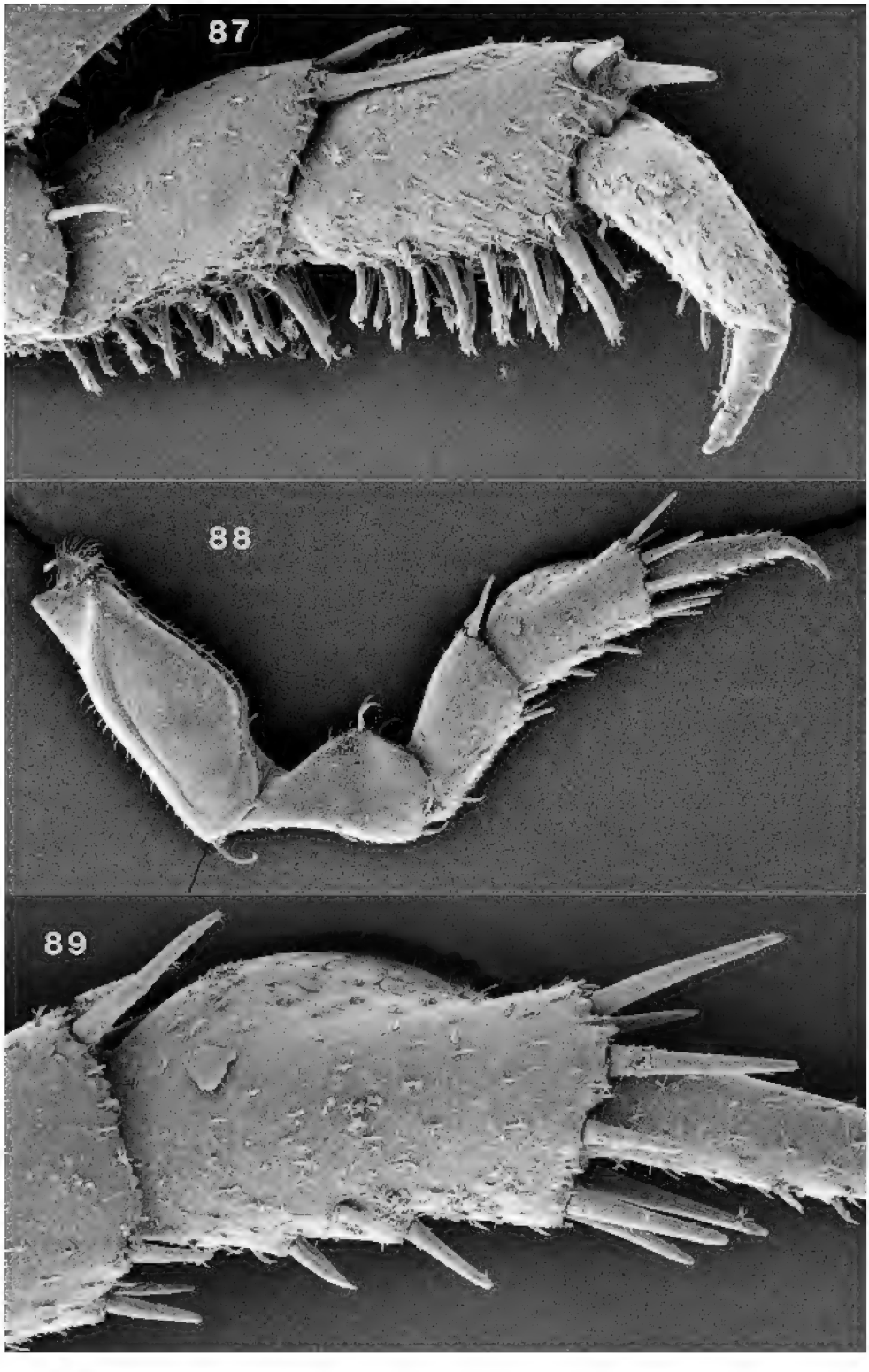
Head with rounded median lobe (figs. 82–83), not as wedge-shaped as in *L. naupliensis.* Pereion-epimera I with straight hind-margin (fig. 82). Inner margins of pleon-tergite V diverging (fig. 92). Telson slightly shorter than in *L. naupliensis* (fig. 92).



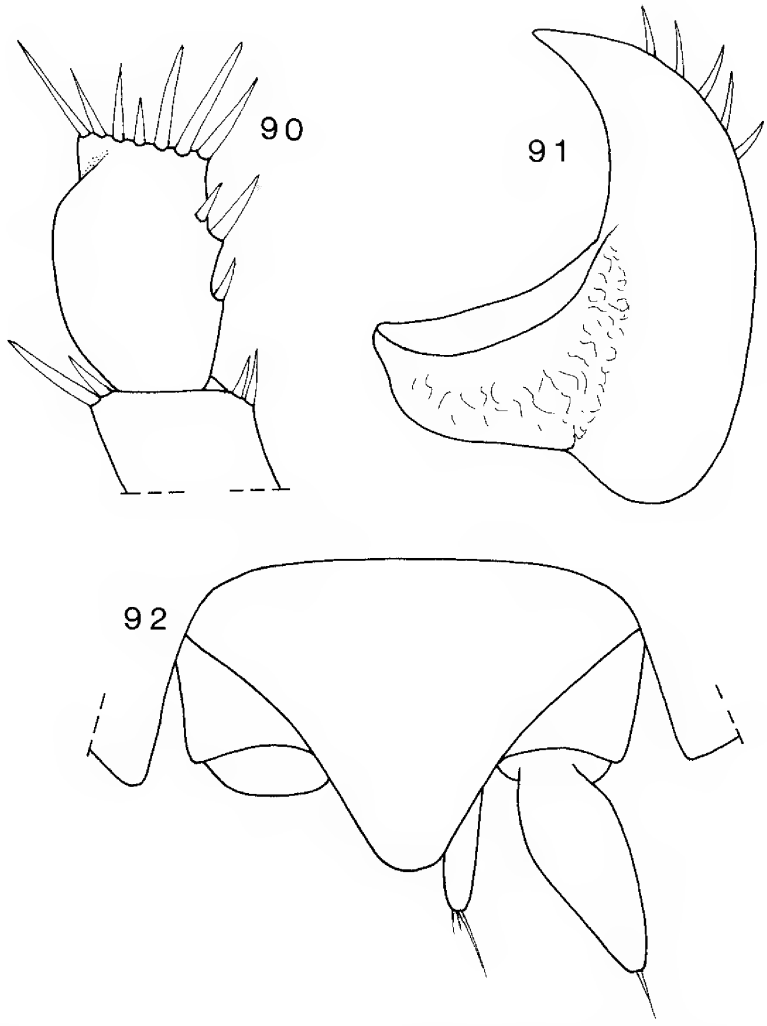
Figs. 82–83. *Leptotrichus spinosus* n.sp., paratype, ♂, 6 mm long, island Thásos (SMNS T426), SEM, critical point preparation, head and pereion-tergites I and II.



Figs. 84–86. Same specimen as before. – 84. Scale-spine and cuticular scales on surface of head; – 85. epimeron of pereion-tergite I in dorsal view; – 86. enlarged detail of margin of pereion-tergite I.



Figs. 87–89. *Leptotrichus spinosus* n.sp., holotype, ♂, 5.3 mm long, island Thásos (SMNS T403), SEM, air-dried. – 87. Pereiopod I, caudal side; – 88. and 89. pereiopod VII and enlarged carpus VII, frontal side.



Figs. 90–92. Same specimen as before. – 90. Carpus VII, caudal side; – 91. pleopod-exopodite I; – 92. telson and uropod in situ.

Antenna II with distal joint of flagellum three times as long as proximal joint. Pereiopods I–IV in male with spine brushes as in the other species of the genus (fig. 87). Male pereiopod VII see figs. 88, carpus with ridge over most of its length (figs. 89–90). Male pleopod-exopodite I with apex curved outwards, medial margin evenly convex, equipped with 4 or 5 very strong spines (fig. 91, in all investigated specimens), similar to this appendage in *L. mersinensis corniger.* The latter lacks however the very conspicuous medial spines and has a differently shaped male carpus VII and, according to the descriptions, a different tergal setation. So according to the present state of knowledge I consider *spinosus* a separate species.

3.6. *Leptotrichus syrensis* (Verhoeff, 1902) (figs. 94–103 and map fig. 93)

Material examined

Greece: 1 ♂, S-Aegean, island Síros, Ermúpoli, leg. SCHMALFUSS 24. V. 1976 (SMNS 1698, SCHMALFUSS 1979). – 13 sp., S-Aegean, island Mílos, Adámas. leg. SCHMALFUSS 23. IV. 1993 (SMNS 2342). – 1 ♂, S-Aegean, island Santoríni, "Thera", leg. MOSER V. 1930 (SMNS 2125). – 1 ♂, N-Aegean, island Ayios Evstrátios, leg. LIEBEGOTT 20. V. 1987 (SMNS 2166). – 3 sp., island Ayios Evstrátios, leg. MYLONAS II. 1989 (SMNS 2210). – 2 sp., N-Aegean, island Límnos, SE Kalliópi, sandy beach, mouth of freshwater stream, leg. ERHARD 24. V. 1995 (SMNS 2518).

Further records

Greece: Central Aegean, island Síros (VERHOEFF 1902, SCHMALFUSS 1979); – islands Ándhros, Sámos, Síros, Sífnos, Mílos (SFENTHOURAKIS 1994).

Turkey: Lake of Burdur (SW-Anatolia, VERHOEFF 1941); – Vilyat Burdur, Gölhisar near Tefenni; Vilyat Denizli, Pamukkale (SW-Anatolia, STROUHAL 1960).

Distribution see chapter 2. and map fig. 93

Diagnostic characters

Maximum dimensions: STROUHAL (1960: 114) reports a male from Pamukkale in Turkey with the dimensions 10.2×5.3 mm. The biggest specimen in the investigated material is a female measuring 10.0×4.8 mm.

Coloration: Different from all other species; tergites dark brownish grey, epimera light yellowish.

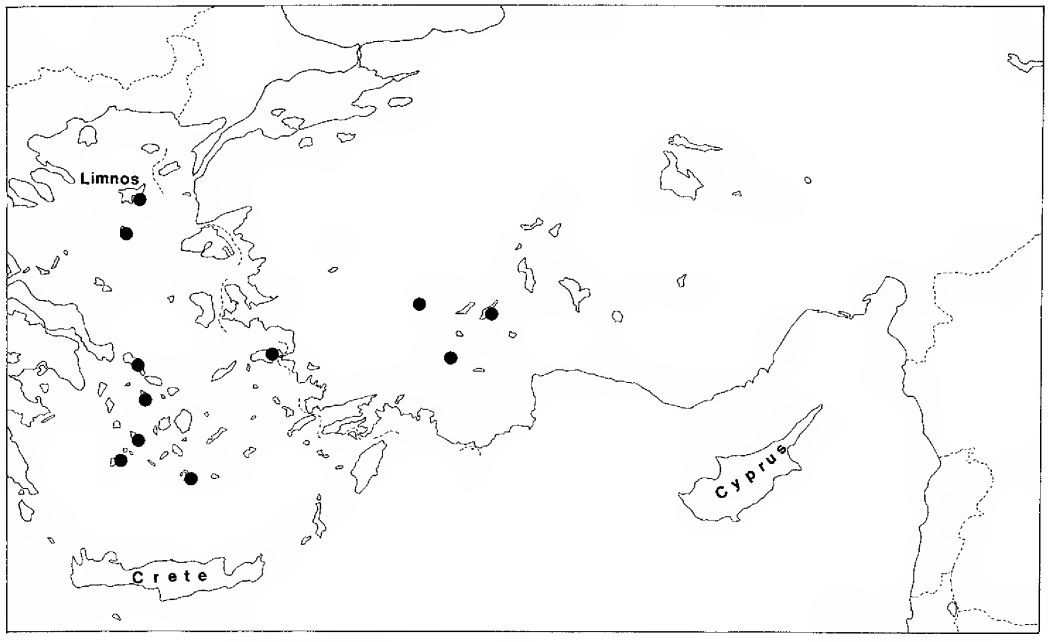
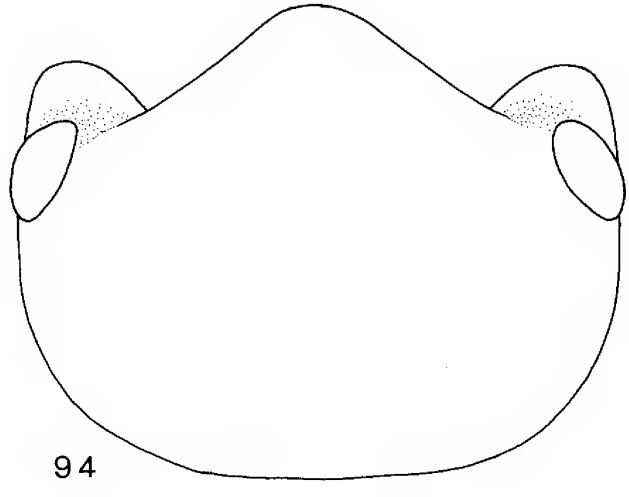


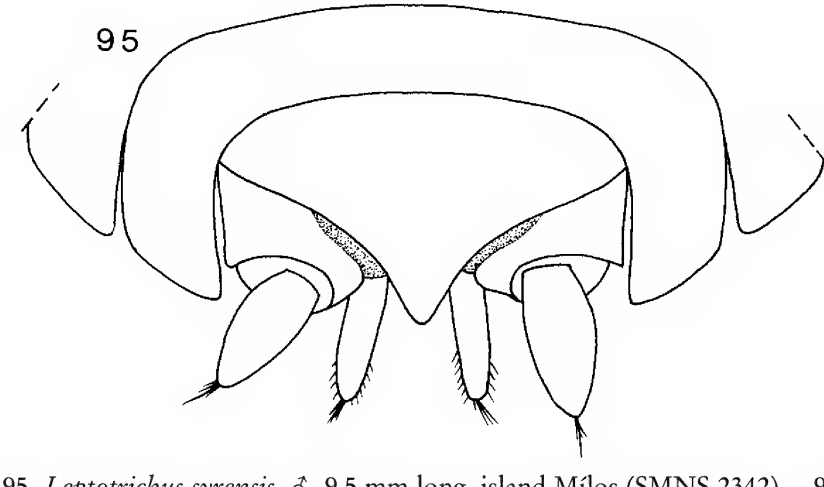
Fig. 93. Records of *Leptotrichus syrensis.*

Cuticular structures: Tergal parts with upright hair-like setae directed backwards (figs. 99–100), epimeral margins with a row of very long setae standing at a right angle to the margin in alcohol-preserved specimens. Their curly appearance in the critical point dried SEM-preparation is thus an artificial effect of the treatment. The same has apparently happened to the microscopic preparations depicted by STROUHAL (1960: 109, figs. 24–25).

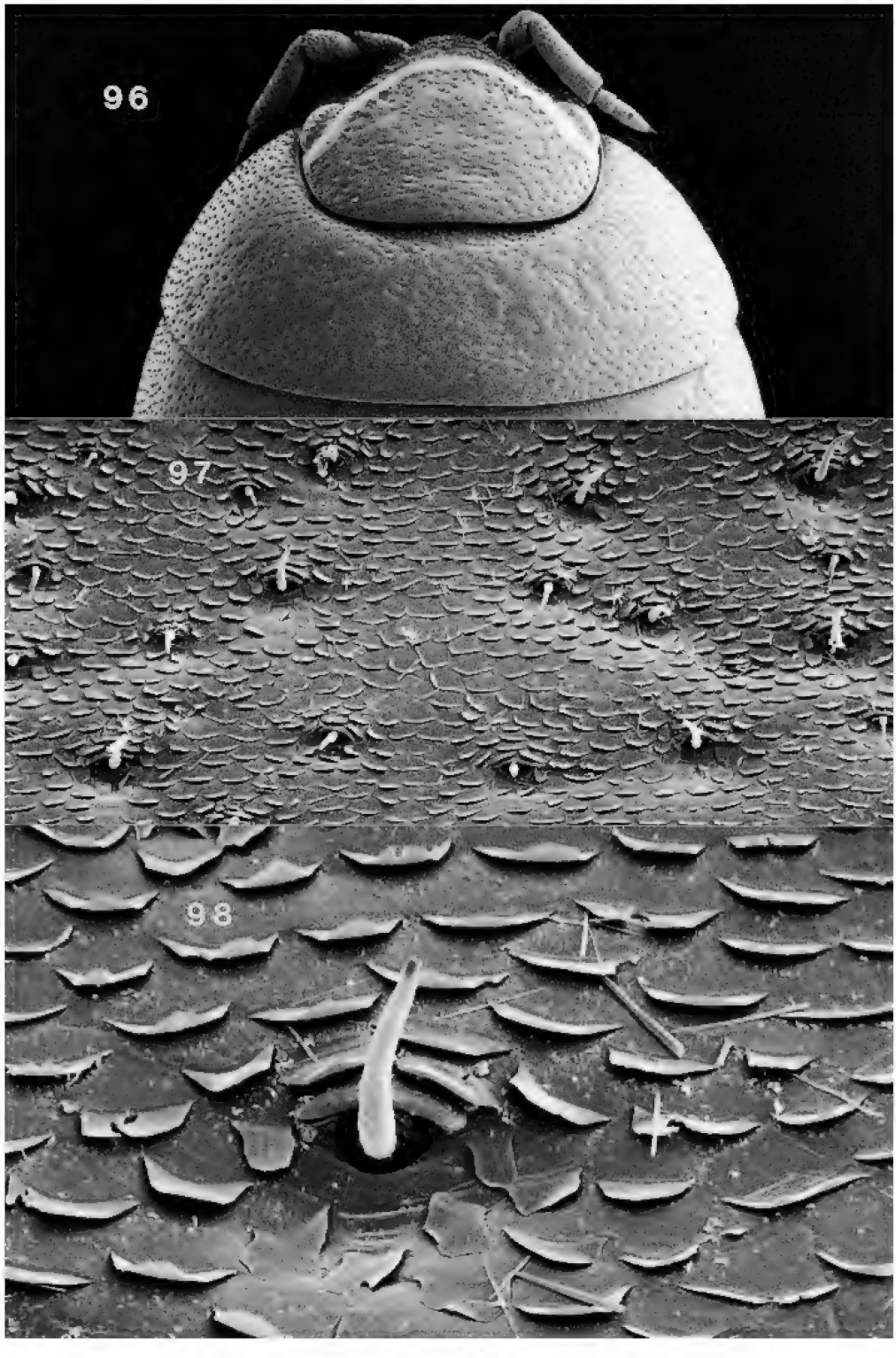
Head with angular median process considerably surpassing sidelobes (figs. 94, 96). Hind margin of pereion-epimeron I slightly concave. Inner sides of pleopod-epimera V parallel (fig. 95). Telson shorter than in all other species, sides concave, apex acutely pointed (fig. 95), not broadly rounded as in all other treated species.

Antenna II with distal joint of flagellum twice as long as proximal one. Male pereiopods I–IV with spine brushes on merus and carpus as in the other species. Male pereiopod VII with ischium proximally concave, on frontal side with a specific groove and 2 conspicuous lateral spines (fig. 101) as in *L. panzerii;* distal-ventrally with 3 or 4 long spines (in *L. panzerii* only one medium-sized spine). Carpus VII

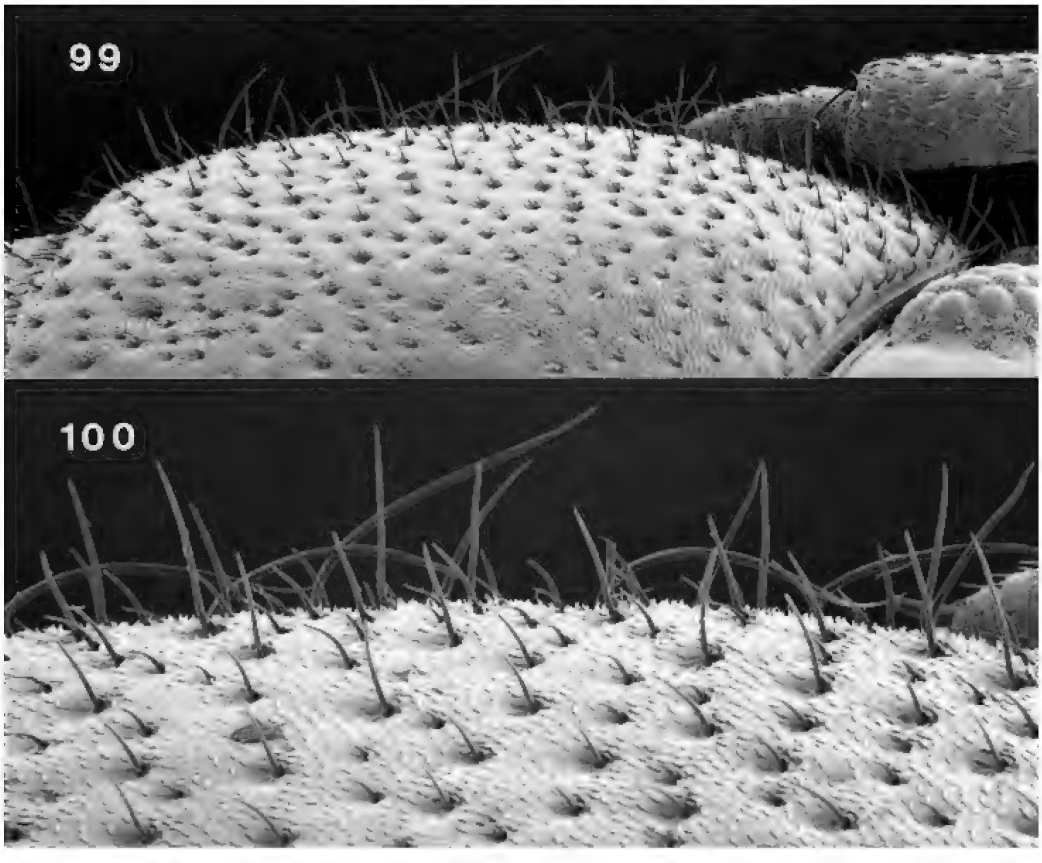




Figs. 94–95. *Leptotrichus syrensis,* ♂, 9.5 mm long, island Mílos (SMNS 2342). – 94. Head in dorsal view; – 95. pleon-tergite V, telson and uropods in situ.



Figs. 96–98. *Leptotrichus syrensis,* ♂; 9 mm long, island Mílos (SMNS 2342), SEM, critical point preparation, head and pereion-tergite I and enlarged details with scale-spines and cuticular scales on surface of head.



Figs. 99–100. Same specimen as before, epimeron of pereion-tergite I and enlarged detail of its margin.

with a very low but distinct ridge (fig. 102). Male pleopod-exopodites I (fig. 103) and II with long, acutely pointed hind-lobes. Uropod-exopodite much shorter than in any other of the treated species (fig. 95).

Remarks

Verhoeff (1902) described *L. syrensis* from the Aegean island Síros. Strouhal (1960) established a new subspecies *anatolicus* after specimens from the southwestern Turkish mainland, which is said to differ from the typical *syrensis* (which Strouhal has not seen) by the lack of spines on the outer margin of the hind-lobe of the male pleopod-exopodite I. In the specimens from the Aegean island Mílos, depicted in the present paper, these spines lack as well. Thus these differences, if they are not due to inaccuracies in Verhoeff's drawings, should be due to individual variability. The subspecies *anatolicus* is therefore considered invalid.

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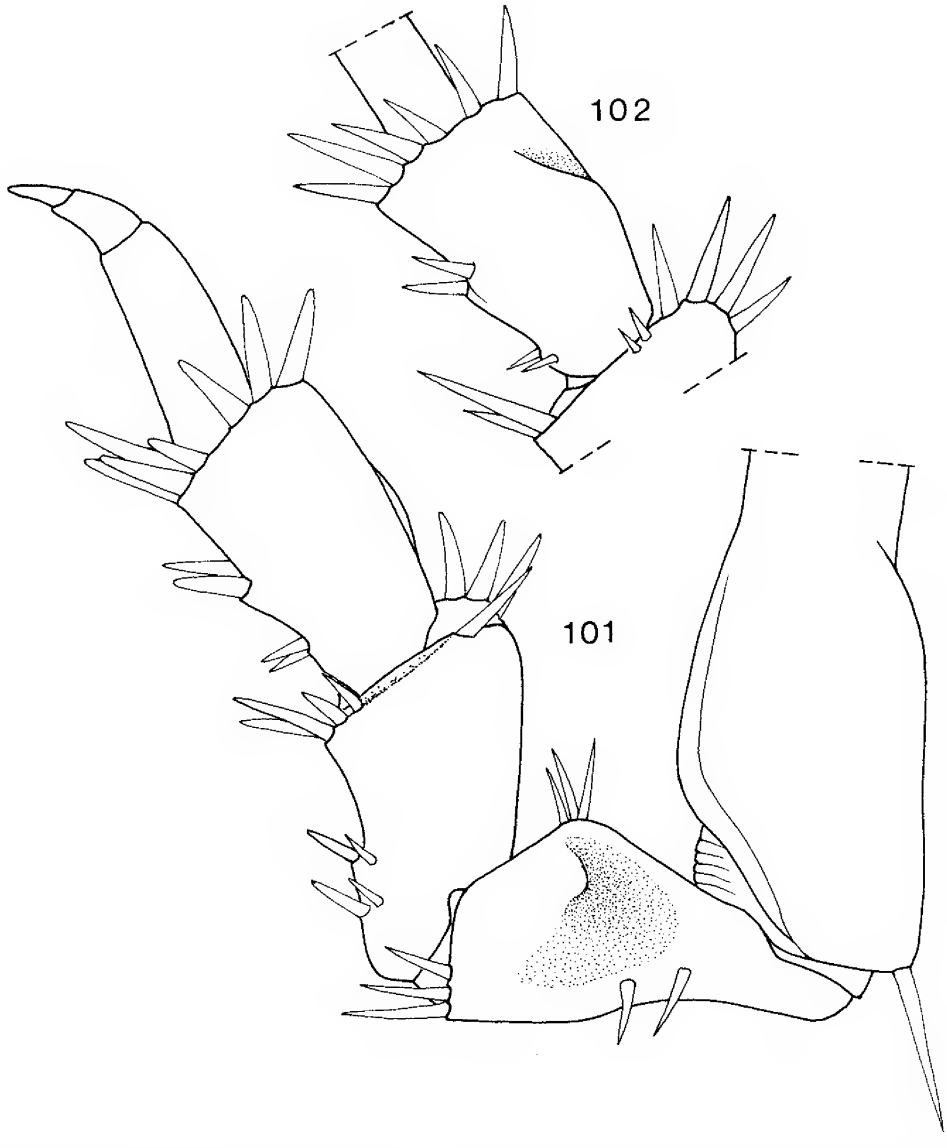

Figs. 101–102. Same specimen as fig. 94. – 101. Pereiopod VII, frontal side; – 102. carpus VII, caudal side.

mailia/Egypt), F. Bretzendorfer (SMNS), Dr. F. Erhard (SMNS), Dr. R. Grimm (Tübingen), Dr. B. Hauser (Geneva), Prof. Dr. R. Kinzelbach (Rostock), C. Leidenroth and S. Leidenroth (formerly Fiechtner) (SMNS), Prof. Dr. M. Mylonas (Athens), D. Liebegott (Frankfurt/Main), A. Pauli (Illingen), Dr. H. Pieper (Raisdorf), Dr. A. Rachinsky (Tübingen), Dr. C. Rieger (Nürtingen), Dr. W. Schawaller (SMNS), J. Scheuern (Westum), Dr. S. Sfenthourakis (Athens), T. Tantawi (Alexandria/Egypt), Prof. Dr. M. Warburg (Haifa). All these donations are gratefully acknowledged. Thanks are due to Dr. U. Guber (NMW), Ms. M. Lowe (NHML) and Dr. L. Tiefenbacher (ZSM) for the loan of type specimens and to Drs. F. Ferrara and S. Taiti (Firenze) for help with information and comments on the manuscript. Dr. K. Wolf-Schwenninger (SMNS) operated the SEM and produced the photographs.

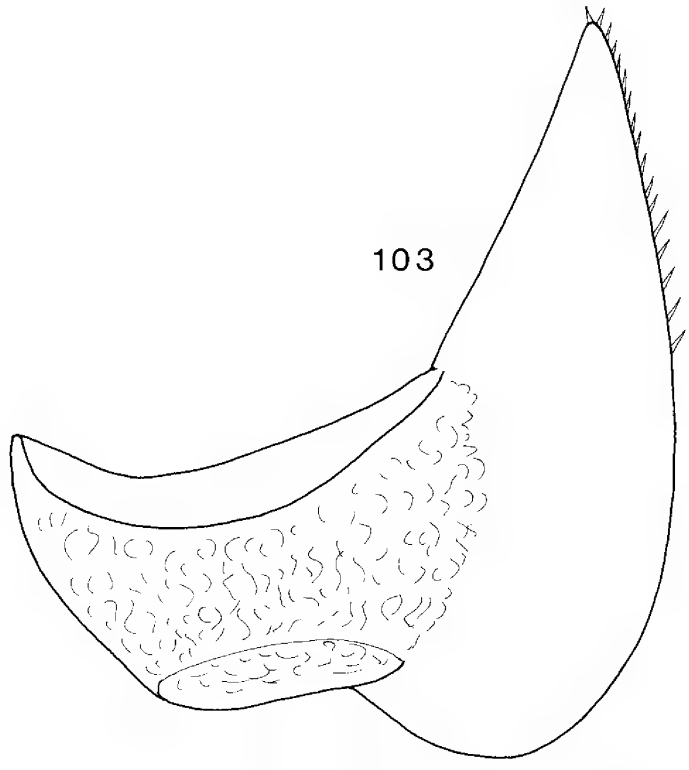

Fig. 103. Same specimen as fig. 94, pleopod-exopodite I.

Abbreviations:
NHML = Natural History Museum London;
NMW = Naturhistorisches Museum Wien (Vienna);
SMNS = Staatliches Museum für Naturkunde Stuttgart + isopod collection no.;
sp. = specimens;
ZSM = Zoologische Staatssammlung München (Munich).

5. Literature

AHMED, M. (1974): Studies on certain species of terrestrial Isopoda from Basrah region, Iraq. – Bull. Basrah nat. Hist. Mus. **1:** 17–42; Basrah.

ARCANGELI, A. (1914 a): Escursioni zoologiche del Dr. ENRICO FESTA nell'Isola di Rodi. Isopodi. – Boll. Musei Zool. Anat. comp. R. Univ. Torino **28:** 1–22; Torino.

– (1914 b): La collezione di isopodi terrestri del R. Museo di Zoologia degli Invertebrati di Firenze. – Atti Soc. ital. Sci. nat. Milano **52:** 445–486; Milano.

– (1924): Gli isopodi terrestri della Sardegna. – Boll. Musei Zool. Anat. comp. R. Univ. Torino **39:** 13–75, plates 4–5; Torino.

– (1926 a): Contributo alla conoscenza della fauna isopodologica delle terre circonstanti all'alto Adriatico. – Atti Mus. civ. St. nat. Trieste **11:** 1–62; Trieste.

– (1926 b): Zoologische Ergebnisse einer Reise nach den Pelagischen Inseln und Sizilien. 8. Isopoda. – Senckenbergiana **8:** 265–270; Frankfurt/M.

– (1929 a): Ricerche faunistiche nelle isole dell'Egeo. Isopodi. – Archo zool. ital. **13:** 259–268; Napoli.

– (1929 b): Isopodi terrestri raccolti nel 1925 in Italia dal Dr. E. DUDICH ed esistenti nel Museo Nazionale Ungherese (Budapest). – Annls hist.-nat. Mus. natn. hung. **26:** 60–71, plate 1; Budapest.

– (1930 a): Isopodi terrestri raccolti nelle isole Canarie dal Prof. FILIPPO SILVESTRI. – Boll. Lab. Zool. gen. agr. R. Scuola Agric. Portici **24:** 82–91; Portici.
– (1930 b): Contributo alla conoscenza del "microgenton" di Costa Rica. – Boll. Lab. Zool. gen. agr. R. Scuola Agric. Portici **25:** 1–29; Portici.
– (1934): Nuovi contributi alla conoscenza della fauna delle isole dell'Egeo. III. Isopodi terrestri. – Boll. Lab. Zool. gen. agr. **28:** 37–69; Portici.
– (1936 a): Isopodi terrestri dell'Isola di Cipro. – Boll. Musei Zool. Anat. comp. R. Univ. Torino **45:** 5–25; Torino.
– (1936 b): Isopodi terrestri. Correzioni aggiunte, critiche. – Boll. Musei Zool. Anat. domp. R. Univ. Torino (Ser. 3) **45:** 257–279; Torino.
– (1937): Nuovi contributi alla conoscenza della fauna delle isole italiane dell'Egeo. VII. Isopodi terrestri (2a nota). – Boll. Lab. Zool. gen. agr. R. Scuola Agric. Portici **30:** 75–86; Portici.
– (1938): Isopodi raccolti in Asia Minore dal Sig. HENRI GADEAU DE KERVILLE. – Voyage zoologique d'HENRI GADEAU DE KERVILLE en Asie-Mineure (Avril–Mai 1912), Vol. **1:** 29–65; Rouen.
– (1942): *Porcellio (Lucasius) leptotrichoides,* nuova specie di crostaceo isopodo terrestre dell'isola Grande Salvage. – Boll. Musei Zool. Anat. comp. R. Univ. Torino **49:** 223–225, plate 1; Torino.
– (1947): Raccolte faunistiche compiute nel Gargano da A. GHIGI e F. P. POMINI. II. Isopodi terrestri. – Acta Pont. Acad. Scient. **12:** 93–114; Roma.
– (1950): Gli isopodi terrestri della Sardegna. 2a edizione. – Boll. Ist. Mus. Zool. Univ. Torino **2:** 77–191, plates 1–7; Torino.
– (1952): La fauna isopodologica terrestre della Puglia e delle isole Tremiti e la sua probabile origine in rapporto alla diffusione transadriatica di specie. – Memorie Biogeogr. adriat. **2:** 109–172; Venezia.
– (1957): Missione ZAVATTARI per l'esplorazione biogeografica delle isole Pelagie. Isopodi terrestri. – Riv. Biol. colon. **15:** 83–95; Roma.
– (1958): La fauna isopodologica degli arcipelaghi di Madera e delle Canarie: la sua importanza per la sistematica e la biogeografia. – Mems Estud. Mus. zool. Univ. Coimbra **255:** 1–108; Coimbra.
ARGANO, R. & MANICASTRI, C. (1991): A preliminary report on oniscidean fauna from central Tyrrhenian islands. – The biology of terrestrial isopods **3:** 3–8; Poitiers.
– & – (1995): Gli isopodi terrestri delle piccole isole circumsarde. – Biogeographia **18:** 283–298; Bologna.
AUBERT, A. & DOLLFUS, A. (1890): Notice sur les isopodes terrestres de Marseille et de Salon. – Bull. Soc. Études scient. Paris **13:** 3–12, plate 2; Paris.
AUDOUIN, V. (1826): Explication sommaire des planches des crustacés de l'Égypte et de la Syrie, publiées par JULES CÉSAR SAVIGNY. – *In:* SAVIGNY, J.-C.: Description de l'Égypte, Histoire naturelle, Zoologie 1 (4e partie) pp. 77–98, plates 1–13; Paris.
BOONE, P. (1918): Descriptions of ten new isopods. – Proc. U. S. natn. Mus. **54:** 591–604; Washington.
BORRE, A. (1886): Crustacés isopodes recueillis par feu CAMILLE VAN VOLXEM, pendant son voyage en Portugal, en 1871. – Annls Soc. r. zool. malacol. Belg. **30:** 112–113; Bruxelles.
BORUTZKY, E. (1972): [List of holotypes of Isopoda Oniscoidea in the Zoological Museum of the University of Moscow]. – Sb. Trud. zool. Mus. **12:** 191–200; Moscow. [in Russian]
BRANDT, I. (1833): Conspectus Monographiae Crustaceorum Oniscodorum Latreillii. – Bull. Soc. imp. Natural. Moscou **6:** 171–193, plate 4; Moscow.
BRIAN, A. (1932): Spedizione scientifica all'Oasi di Cufra (Marzo-Luglio 1931). Gli isopodi terrestri. – Annali Mus. civ. Stor. nat. Giacomo Doria **55:** 329–352, plates 8–10; Genova.
BUDDE-LUND, G. (1885): Crustacea Isopoda Terrestria per familias et genera et species descripta. – 319 pp.; Copenhagen.
– (1896): Land-Isopoden aus Griechenland, von E. v. OERTZEN gesammelt. – Arch. Naturgesch. **62:** 39–48; Berlin.
– (1898): Die Land-Isopoden Ost-Afrikas. – *In:* Thierwelt Deutsch-Ostafrikas, Vol. **4:** 1–10; Berlin.
– (1908): Isopoda von Madagaskar und Ostafrika mit Diagnosen verwandter Arten. – *In:* VOELTZKOW, A.: Reise in Ostafrika in den Jahren 1903–1905. – Wiss. Ergebn. **2:** 265–308, plates 12–18; Stuttgart.

– (1909 a): Zoologische und anthropologische Ergebnisse im westlichen und zentralen Südafrika, Band 2, IX. Isopoden (I), Land-Isopoden. – Denkschr. med.-naturw. Ges. Jena **14:** 53–70, plates 5–7; Jena.
– (1909 b): Terrestrial isopods from Egypt. – Results of the Swedish Zoological Expedition to Egypt and the White Nile, Vol. **3:** 1–12, plate 1; Uppsala.
– (1913 a): Über einige Oniscoideen von Australien (nachgelassenes Fragment). – Mitt. naturhist. Mus. Hamburg **30:** 65–72, 1 plate; Hamburg.
– (1913 b): Terrestrial Isopoda, particularly considered in relation to the distribution of the southern Indo-Pacific species. – Trans. Linn. Soc. Lond. (2nd Ser.) (Zool.) **15:** 367–394; London.
Caruso, D. (1968): Isopodi terrestri delle isole Eolie. Nota I. – Boll. Sed. Accad. gioenia Sci. nat. (Ser. 4) **9:** 351–365; Catania.
– (1973 a): Isopodi terrestri delle Isole Egadi. – Boll. Sed. Accad. gioenia Sci. nat. (Ser. 4) **11:** 69–94; Catania.
– (1973 b): Isopodi terrestri delle Isole Eolie ed Egadi. – Lav. Soc. ital. Biogeogr. (N.S.) **3:** 1–12.
– (1974): Isopodi terrestri delle Isole Pelagie. – Animalia **1:** 135–156; Catania.
– (1976): Isopodi terrestri dell'Isola di Pantellaria. – Animalia **3:** 105–124; Catania.
– (1982): Il popolamento cavernicolo della Sicilia. – Lav. Soc. ital. Biogeogr. (N.S.) **7:** 587–614.
Caruso, D., Baglieri, C., Di Maio, M. & Lombardo, B: (1987): Isopodi terrestri di Sicilia ed isole circumsiciliane. – Animalia (Suppl.) **14:** 5–211; Catania.
Caruso, D. & Costa, G. (1978): Ricerche faunistiche ed ecologiche sulle grotte di Sicilia. VI. Fauna cavernicola di Sicilia. – Animalia **5:** 423–513; Catania.
Caruso, D. & Lombardo, B. (1976): Isopodi terrestri dell'Isola di Ustica. – Animalia **3:** 225–233; Catania.
– & – (1982): Isopodi terrestri delle Isole Maltese. – Animalia **9:** 5–52; Catania.
– & – (1995): Arthropoda di Lampedusa, Linosa e Pantellaria. Crustacea Isopoda Oniscidea. – Naturalista sicil. (Suppl.) **19:** 99–114; Palermo.
Cecconi, G. (1908): Contributo alla fauna delle Isole Tremiti. – Boll. Musei Zool. Anat. comp. R. Univ. Torino **23:** 1–53; Torino.
Cruz, A. (1989): Isópodos terrestres de Menorca. – Endins **14–15:** 89–93; Palma de Mallorca.
– (1991): Isópodos terrestres de la colección del Museu de Zoologia de Barcelona. – Miscellanea zool. **15:** 81–102; Barcelona.
Dalens, H. (1977): Le mâle de *Leptotrichus (Atlantotrichus) leptotrichoides* (Arcangeli). – Bull. Soc. Hist. nat. Toulouse **113:** 293–297; Toulouse.
Dollfus, A. (1892 a): Catalogue raisonné des isopodes terrestres de l'Espagne. – An. Soc. esp. Hist. nat. **21:** 161–190; Madrid.
– (1892 b): Note sur les isopodes terrestres et fluviatiles de Syrie recueillis principalment par M. le Dr. Th. Barrois. – Revue biol. Nord Fr. **4:** 1–15, plates 3–4, Lille.
– (1893): Voyage de M. Ch. Alluaud aux Îles Canaries (novembre 1889–juin 1890). Isopodes terrestres. – Mém. Soc. zool. Fr. **6:** 46–56; Paris.
– (1894): Viaggio del Dr. E. Festa in Palestina, nel Libano e regioni vicine. X. Crustacés isopodes terrestres et d'eau douce. – Boll. Musei Zool. Anat. comp. R. Univ. Torino **9:** 1–3; Torino.
– (1896): Les isopodes terrestres du nord de l'Afrique du Cap Blanc à Tripoli. – Mem. Soc. zool. Fr. **9:** 523–553; Paris.
– (1898): Note sur les isopodes terrestres du Sénégal. – Bull. Soc. zool. Fr. **23:** 122–126; Paris.
– (1905): Liste des isopodes terrestres recueillis par M. le Dr. Cecconi dans l'île de Chypre. – Feuille jeun. Nat. (4e Sér.) **35:** 163, 172–177; Paris.
– (1906): Sur les isopodes terrestres des Îles Tremiti. – Feuille jeun. Nat. **35:** 32–33; Paris.
El-Kifl, A., Wafa, A., Shafiee, M. & Shereef, G. (1971): Studies on land isopods in Giza region. – Bull. Soc. ent. Égypte **54:** 283–317; Cairo.
Ferrara, F. & Taiti, S. (1978): Gli isopodi terrestri dell'arcipelago toscano. (Studio sistematico e biogeografico. – Redia **61:** 1–106; Firenze.
– & – (1979): A check-list of terrestrial isopods from Africa (south of the Sahara). – Monitore zool. ital. (N.S.) Suppl. **12:** 89–215; Firenze.

– & – (1998): Biogeography of the Oniscidean fauna of Somalia. – Israel J. Zool. **44:** 283–290; Jerusalem.

FRANKENBERGER, Z. (1939): O nekterych isopodech z Mesopotamie. Sur quelques isopodes de la Mésopotamie. – Sb. ent. Odd. nar. Mus. Praze **17:** 23–31; Prague.

GARCIA, L. & CRUZ, A. (1993): Historia natural de l'Arxipelag de Cabrera. XIX. Els isopodes terrestres. – Mon. Soc. Hist. nat. Balears **2:** 323–332; Palma de Mallorca.

– & – (1996): Els isopodes terrestres de les Illes Balears: cataleg d'especies. – Boll. Soc. Hist. nat. Balears **39:** 77–99; Palma de Mallorca.

HOESE, B. (1984): Checkliste der terrestrischen Isopoden der Kanarischen Inseln. – Cour. Forsch.-Inst. Senckenberg **71:** 27–37; Frankfurt/M.

HORNUNG, E. & WARBURG, M. (1996): Intra-habitat distribution of terrestrial isopods. – Eur. J. Soil Biol. **32:** 179–185; Paris.

IWAMOTO, K. (1943): On Japanese terrestrial isopods. – Plants Animals **11:** 959–974.

JOLIVET, P. (1953): Arthropodes récoltés a Cabrera. – Vie Milieu **4:** 553–555; Paris.

KARAMAN, M. (1966): Kopnezi izopodi (Isopoda terrestria) Jugoslavije. – Zbornik fil. Fak. Priština **3:** 371–404; Priština.

KHEIRALLAH, A. (1973): Food preferences of the hothouse millipede *Orthomorpha gracilis* (Koch) and the isopod *Leptotrichus panzeri* (Aud. and Sav.). – Bull. Soc. ent. Égypte **57:** 371–377; Cairo.

– (1975): Population density and pattern of distribution of the terrestrial isopods *Leptotrichus panzeri* and *Philocia africana* in different types of Alexandria soils. – Bull. Soc. ent. Égypte **59:** 217–224; Cairo.

– (1980 a): Aspects of the distribution and community structure of isopods in the Mediterranean coastal desert of Egypt. – J. arid Environm. **3:** 69–74; London.

– (1980 b): The life history and ecology of *Leptotrichus panzerii* in Egypt. – Revue Ecol. Biol. Sol **17:** 393–403; Montrouge.

KHEIRALLAH, A. & OMRAM, H. (1986): Population density, biomass and life history of the terrestrial isopod *Leptotrichus naupliensis* in a grassland of Abeis region, Egypt. – Revue Ecol. Biol. Sol **23:** 319–332; Montrouge.

KOELBEL, K. (1884): *In:* WASMANN, E.: Kritisches Verzeichnis der myrmekophilen und termitophilen Arthropoden. – XV + 231 pp.; Berlin.

KRAEPELIN, K. (1895): Zoologische Ergebnisse einer Frühjahrs-Exkursion nach Madeira und den Canarischen Inseln. – Verh. naturw. Ver. Hamb. **2:** 6–17; Hamburg.

LUCAS, H. (1849): Histoire naturelle des animaux articulés. Crustacés. Les cloportides. – Exploration scientifique de l'Algérie pendant les années 1840, 1841, 1842, Zool. **1:** 67–73, plates 6–7; Paris.

MUCHMORE, W. (1993): List of terrestrial invertebrates of St. John, U.S. Virgin Islands (exclusive Acarina and Insecta), with notes on some records of fresh water species. – Caribb. J. Sci. **29:** 30–38; Mayaguez (Puerto Rico).

NUNOMURA, N. (1987): Studies on the terrestrial isopod crustaceans in Japan. IV. Taxonomy of the families Trachelipidae and Porcellionidae. – Bull. Toyama Sci. Mus. **11:** 1–76; Toyama.

– (1992): Studies on the terrestrial isopod crustaceans in Japan. VII. Supplements to the taxonomy – 3. – Bull. Toyama Sci. Mus. **15:** 1–23; Toyama.

OMER-COOPER, J. (1923): The terrestrial Isopoda of Mesopotamia and the surrounding districts. – J. Bombay nat. Hist. Soc. **29:** 93–106; Bombay.

PAULIAN DE FÉLICE, L. (1939): Récoltes de R. PAULIAN et A. VILLIERS dans le Haut Atlas marocain 1938 (septième note). Isopodes terrestres. – Bull. Soc. Sci. nat. Maroc **19:** 191–213; Rabat.

PEARSE, A. (1916): An account of the Crustacea collected by the WALKER expedition to Santa Marta, Colombia. – Proc. U.S. natn. Mus. **49:** 531–556; Washington D.C.

– (1917): Isopoda collected by the BRYANT WALKER expedition to British Guiana, with notes on Crustacea from other localities. – Occ. Pap. Mus. Zool. Univ. Mich. **46:** 1–8; Ann Arbor.

– (1921): Crustacea from Lake Valencia, Venezuela. – Proc. U.S. natn. Mus. **59:** 459–462; Washington D.C.

PRETZMANN, G. (1974): Isopoden aus Israel (det. STROUHAL). – Annln naturhist. Mus. Wien **78:** 445–452; Wien.

RADU, V. (1973): Un nouvel genre d'isopode terrestre, *Leptotrichus* B.-L. dans la faune de la Roumanie. – Revue roum. Biol. (Zool.) **18:** 91–102; Bucureşti.
– (1985): Crustacea, Ordinul Isopoda, Subordinul Onicoidea, Crinocheta. – Fauna Republ. social. Romania, Vol. 4, Fasc. **13:** 1–158; Bucureşti.
RICHARDSON, H. (1902): The marine and terrestrial isopods of the Bermudas, with descriptions of new genera and species. – Trans. Conn. Acad. Arts Sci. **11:** 277–310, plates 37–40; New Haven.
– (1905): A monograph on the isopods of North America. (Oniscoidea pp. 583–717). – Bull. U.S. natn. Mus. **54:** XXIII + 727 pp.; Washington.
– (1926): Crustacés isopodes terrestres et d'eau douce récoltés par M. HENRI GADEAU DE KERVILLE pendant son voyage zoologique en Syrie. – Voyage zoologique d'HENRI GADEAU DE KERVILLE en Syrie (avril–juin 1908), pp. 203–210; Paris.
SCHMALFUSS, H. (1972 a): Die Isopoden von Kreta. – Biol. gallo-hellen. **4:** 33–60; Athens.
– (1972 b): Die Isopoden der Inseln Rhodos und Karpathos (Südostägäis). – Zool. Jb. (Abt. Syst.) **99:** 561–609; Jena.
– (1975): Neues Isopoden-Material aus Griechenland. – Sber. öst. Akad. Wiss. (math.-nat. Kl., Abt. 1) **184:** 27–66; Wien.
– (1979): Revidierte Check-list der Landisopoden (Oniscoidea) Griechenlands. – Stuttgarter Beitr. Naturk. (Ser. A) 331: 42 pp.; Stuttgart.
– (1981): Die Isopoden der Nördlichen Sporaden (Ägäis). – Stuttgarter Beitr. Naturk. (Ser. A) 343: 24 pp.; Stuttgart.
– (1982): Die Landisopoden der Kapverdischen Inseln. – Cour. Forsch.-Inst. Senckenberg **52:** 131–136; Frankfurt/M.
– (1999): Terrestrial isopod records from Greek islands. – Newsletter Hell. zool. Soc. **31:** 5–7; Athens.
SCHMALFUSS, H. & FERRARA, F. (1978): Terrestrial isopods from West Africa. Part 2: Families Tylidae, Ligiidae, Trichoniscidae, Styloniscidae, Rhyscotidae, Halophilosciidae, Philosciidae, Platyarthridae, Trachelipidae, Porcellionidae, Armadillidiidae. – Monitore zool. ital. (N.S.) (Suppl.) **11:** 15–97; Firenze.
SCHMALFUSS, H. & SCHAWALLER, W. (1984): Die Fauna der Ägäis-Insel Santorin. Teil 5. Arachnida und Crustacea. – Stuttgarter Beitr. Naturk. (Ser. A) 371: 16 pp.; Stuttgart.
SCHMÖLZER, K. (1965): Bestimmungsbücher zur Bodenfauna Europas. Ordnung Isopoda (Landasseln). – Lieferung 4+5: 468 pp.; Berlin.
– (1971): Die Landisopoden der Iberischen Halbinsel. – Monografias Ciencia mod. **80:** XI + 161 pp., 10 maps; Madrid.
SCHULTZ, G. (1972): Ecology and systematics of terrestrial isopod crustaceans from Bermuda. – Crustaceana (Suppl.) **3:** 79–99; Leiden.
SFENTHOURAKIS, S. (1993): Terrestrial isopods from the remote Greek island Antikithira and its surrounding islets. – Revue suisse Zool. **100:** 613–626; Genève.
– (1994): [Biogeography, systematics and ecological aspects of terrestrial isopods in central Aegean islands]. – Ph. D. thesis, University of Athens, 293 pp.; Athens [in Greek]
– (1996): A biogeographical analysis of terrestrial isopods from the central Aegean islands (Greece). – J. Biogeogr. **23:** 687–698; London.
SHEREEF, G. (1970): Biological observations on the woodlice (Isopoda) in Egypt. – Revue Ecol. Biol. Sol **7:** 367–379; Paris.
SIMON, E. (1885): Crustacés. 3. Isopodes. – Exploration scientifique de la Tunisie. Sciences naturelles. Zoologie, pp. 7–16; Paris.
STROUHAL, H. (1928): Weitere Beiträge zur Kenntnis der Fauna Griechenlands und der Inseln des Ägäischen Meeres. III. Land-Isopoden aus Griechenland und den Inseln des Ägäischen Meeres. – Sber. öst. Akad. Wiss. (math.-nat. Kl., Abt. 1) **137:** 795–797; Wien.
– (1929 a): Die Landisopoden des Balkans. 3. Beitrag: Südbalkan. – Z. wiss. Zool. **133:** 57–120; Leipzig.
– (1929 b): Über neue und bekannte Landasseln des Südbalkans im Berliner Zoologischen Museum. – Sber. Ges. naturf. Freunde Berl. **1929:** 37–80; Berlin.
– (1936 a): Zoologische Forschungsreise nach den Ionischen Inseln und dem Peloponnes. XVII. Teil. Isopoda terrestria, I: Ligiidae, Trichoniscidae, Oniscidae, Porcellionidae. – Sber. öst. Akad. Wiss. (math.-nat. Kl., Abt. 1) **145:** 153–177; Wien.
– (1936 b): Die von Prof. Dr. FRANZ WERNER in Griechenland und auf den ägäischen In-

seln gesammelten Landisopoden. – Sber. öst. Akad. Wiss. (math.-nat. Kl., Abt. 1) **145:** 195–200; Wien.
– (1936 c): Die Landasseln der Inseln Korfu, Levkas und Kephalonia. – Acta Inst. Mus. zool. Univ. athen. **1:** 53–111; Athens.
– (1937 a): Zoologische Forschungsreise nach den Ionischen Inseln und dem Peloponnes. XVIII. Teil. Isopoda terrestria. II. Armadillidiidae, Armadillidae. – Sber. öst. Akad. Wiss. (math.-nat. Kl., Abt. 1) **146:** 45–65; Wien.
– (1937 b): Neue Oniscoidea des Südbalkans. – Zool. Anz. **117:** 119–129; Leipzig.
– (1937 c): Isopodi terrestri Aegaei. – Acta Inst. Mus. Zool. Univ. athen. **1:** 193–262; Athens.
– (1937 d): Griechische Landasseln, von Prof. Dr. Franz Werner gesammelt. – Anz. Akad. Wiss. Wien **74:** 180–182; Wien.
– (1938): Oniscoidea Peloponnesi. – Acta Inst. Mus. Zool. Univ. athen. **2:** 1–56; Athens.
– (1942): Vorläufige Mitteilung über die von M. Beier in Nordwestgriechenland gesammelten Asseln. – Zool. Anz. **138:** 145–162; Leipzig.
– (1954): Zoologische Studien in West-Griechenland. IV. Teil. Isopoda terrestria, I: Ligiidae, Trichoniscidae, Oniscidae, Porcellionidae, Squamiferidae. – Sber. öst. Akad. Wiss. (math.-nat. Kl., Abt. 1) **163:** 559–601; Wien.
– (1960): Die Porcellioniden-Gattung *Leptotrichus* in der Türkei. – Zool. Anz. **165:** 90–115; Leipzig.
– (1968): Die Landisopoden der Insel Zypern. – Annln naturhist. Mus. Wien **72:** 299–387; Wien.
Strouhal, H. & Pretzmann, G. (1975): Israelische Isopoden. – Annln naturhist. Mus. Wien **79:** 623–663; Wien.
Taiti, S. & Ferrara, F. (1980) : Nuovi studi sugli isopodi terrestri dell'Arcipelago Toscano. – Redia **63:** 249–300; Firenze.
– & – (1995) Isopodi terrestri delle grotte della Toscana. – Mém. Biospéol. **22:** 169–196; Saint Girons.
– & – (1996): The terrestrial Isopoda of Corsica. – Bull. Mus. natn. Hist. nat., Paris (4me Sér.) **18:** 459–545; Paris.
Vandel, A. (1953): Les isopodes terrestres des provinces d'Almeria et de Granada. – Arch. Inst. Aclimatation **1:** 45–75; Almeria.
– (1954 a): Mission J. Cadenat aux Îles du Cap-Vert. – Bull. Inst. fr. Afr. noire (Sér. A) **16:** 466–478; Paris & Dakar.
– (1954 b): Étude des isopodes terrestres recueillis aux Îles Canaries par J. Mateu en mars–avril 1952. – Mem. Mus. natn. Hist. nat., Paris (N.S., Sér. A) **8:** 1–60; Paris.
– (1954 c): Le peuplement isopodique de Corse; étude biogeographique. – Revue fr. Ent. **21:** 72–84; Paris.
– (1955): Mission Henri Coiffait au Liban (1951). 8. Isopodes terrestres. – Arch. Zool. exp. gén. **91:** 455–531; Paris.
– (1957): Sur la position systematique de *Leptotrichus* (*Atlantotrichus* N.S.G.) *leptotrichoides* (Arcangeli, 1940). – Bull. Mus. natn. Hist. nat., Paris (2e Sér.) **29:** 418–420; Paris.
– (1960): Les isopodes terrestres de l'Archipel Madérien. – Mém. Mus. natn. Hist. nat., Paris (N.S., Sér. A) (Zool.) **22:** 1–155; Paris.
– (1961): Les isopodes terrestres de l'Île de Minorque. – Archs Zool. exp. gén. **99:** 249–265; Paris.
– (1962): Faune de France, 66. Isopodes terrestres (Deuxième partie), pp. 417–931; Paris.
– (1965): La faune isopodique de l'Île de Chypre. – Bull. Mus. natn. Hist. nat. Paris (2e Sér.) **36:** 818–830; Paris.
– (1968): The terrestrial Isopoda of the Azores. – Bol. Mus. munic. Funchal **22:** 5–29; Funchal.
– (1969): Les isopodes terrestres de la Sicile. – Atti Accad. gioenia Sci. nat. (Ser. 7) **1:** 1–59; Catania.
– (1977): La faune terrestre de l'Île de Sainte-Hélène. 4me partie. 1. Isopodes terrestres. – Annls Mus. r. Afr. cent. (Sér. 8vo) **220:** 385–426, plate 2; Tervuren.
Van Name, W. (1925): The isopods of Kartabo, Bartica District, British Guiana. – Zoologica N.Y. **6:** 461–503; New York.
– (1926): Forest isopods from Barro Colorado Island, Panama, Canal Zone. – Am. Mus. Novit. **206:** 1–25; New York.

– (1936): The American land and freshwater isopod Crustacea. – Bull. Am. Mus. nat. Hist. **71:** 1–535; New York.
VERHOEFF, K. (1901): Über paläarktische Isopoden (7. Aufsatz). – Zool. Anz. **24:** 403–408, 417–421; Leipzig.
– (1902): Über paläarktische Isopoden. 8. Aufsatz. – Zool. Anz. **25:** 241–255; Leipzig.
– (1908 a): Über Isopoden. 12. Aufsatz. – Arch. Naturgesch. **74:** 163–198; Berlin.
– (1908 b): Über Isopoden: 15. Aufsatz. – Arch. Biontol. **2:** 335–387; Berlin.
– (1923): Zur Kenntnis der Landasseln Palästinas. – Arch. Naturgesch. (Abt. A) **89:** 206–231; Berlin.
– (1930): Über einige von Herrn Dr. C. R. BOETTGER in Italien gesammelte Diplopoden, Chilopoden und Isopoden. – Mitt. zool. Mus. Berl. **16:** 566–573; Berlin.
– (1933 a): Zur Systematik, Geographie und Ökologie der Isopoda terrestria Italiens und über einige Balkan-Isopoden. – Zool. Jahrb. (Abt. Syst.) **65:** 1–64; Jena.
– (1933 b): Neue Isopoda terrestria aus Mexiko und dem Mediterrangebiet. – Zool. Anz. **103:** 97–119; Leipzig.
– (1940): Der geographische Charakter der Landisopodenfauna italienischer Mittelmeerinseln und über die Landisopoden der Insel Ischia. – Z. Morph. Ökol. Tiere **37:** 105–125; Berlin.
– (1941): Über Land-Isopoden aus der Türkei. – Istanbul Üniv. fen Fak. Mec. (Seri B) **4:** 223–276; Istanbul.
– (1942): Landisopoden der Insel Ischia, systematisch, morphologisch, phänologisch, ökologisch, geographisch beurteilt. – Z. Morph. Ökol. Tiere **38:** 435–482; Berlin.
– (1943): Über Land-Isopoden aus der Türkei. 2. Aufsatz. – Istanbul Üniv. fen Fak. Mec. (Seri B) **8:** 1–29; Istanbul.
– (1944): Isopoden der Insel Capri und der Sorrentinischen Halbinsel nebst ihren geographischen Beziehungen. – Zool. Anz. **144:** 90–115; Leipzig.
– (1949): Über Land-Isopoden aus der Türkei. III. – Istanbul Üniv. fen Fak. Mec. (Seri B) **14:** 21–48; Istanbul.
– (1952): Weitere Beiträge zur Kenntnis der Isopoden- und Diplopodenfauna von Ischia und Capri. – Bonner zool. Beitr. **3:** 125–150; Bonn.
VERHOEFF, K. & STROUHAL, H. (1967): Isopoda terrestria der Türkei, 4. Aufsatz, und über Anpassungen an die Volvation bei den Kuglerfamilien Armadillidiidae, Eubelidae und Armadillidae. – Zool. Jahrb. (Abt. Syst.) **93:** 465–506; Jena.
WARBURG, M. & HORNUNG, E. (1999) : Diversity of terrestrial isopod species along a transect through northern Israel. – Biodivers. Conserv. **8:** 1469–1478; Amsterdam.

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